BBC wildlife

JANUARY
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Issue 01 Vol 43

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COVER IMAGE: FLORIAN SMIT; CATE BLANCHETT: ALAMY;
KILLER WHALES: SUE CLARK/ALAMY; CHEETAH CUBS: GETTY

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It's difficult not to favour cute animals, like these cheetah cubs

Everyone get ready to say "Aww..."

PAUL McGUINNESS, EDITOR

Here at *BBC Wildlife* over the last few weeks, I've noticed how often we comment on an animal's appearance in terms of how it makes us feel. We all cooed over the kiwi chick on p88, and wowed at the jaguar on p69, for example. And yet when we saw the proboscis monkey on p98, we couldn't help but stare at its big nose. And I know I was guilty of calling the saiga (p72) "that weird-looking antelope that looks like something out of *Star Wars*". It's all subjective.

But actually, how we view animals' physical appearance can have a real impact on their survival. We're hard-wired to find our own offspring adorable – it makes evolutionary sense. But how we view other species is a complex issue, as Jo Wimpenny explains in her fascinating feature about the science of cute, on p50.

Enjoy the issue!

Paul

BBC wildlife

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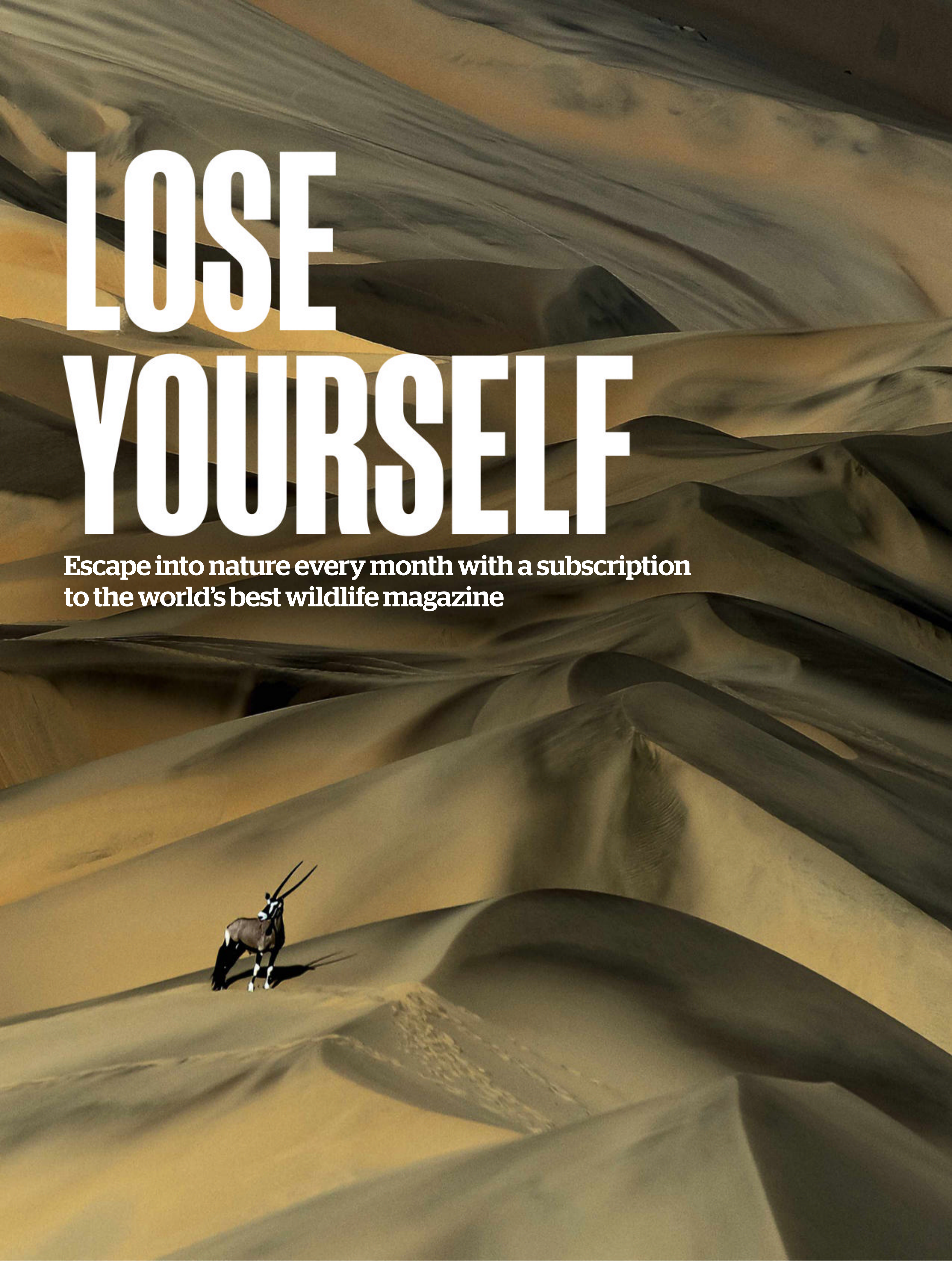
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Scarlet macaws in the Amazon
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The science of cute
WILD SCANDINAVIA
Breathtaking images of the Arctic north

THE COVER

An Arctic fox is one of the many Scandinavian creatures that feature in this month's Portfolio. Photographer Florian Smit says, "For this picture, I stayed in one spot for several days in a row until my plan worked and the fox headed straight towards me with its watchful, amber eyes." He took the shot using a Nikon D4s, Nikkor 400mm, 1/1600sec, f3.5, ISO1000.

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How cuteness impacts conservation

Every month, only in *BBC Wildlife*

NICK BAKER
The minibeast-lover dives down into the deep sea to uncover a woodlouse the size of a cat *P.36*

GILLIAN BURKE
"We have always been fascinated by the self-organising efficiency of social insects" *P.27*

MARK CARWARDINE
"Why are conservationists still being ignored, as if saving life on Earth is an optional extra?" *P.30*

LUCY COOKE
The zoologist shines a light on the dolphins that pass on the skill of 'sponging' *P.29*

MIKE DILGER
"The dazzling phenomenon is the ornithological equivalent of shooting fish in a barrel" *P.32*

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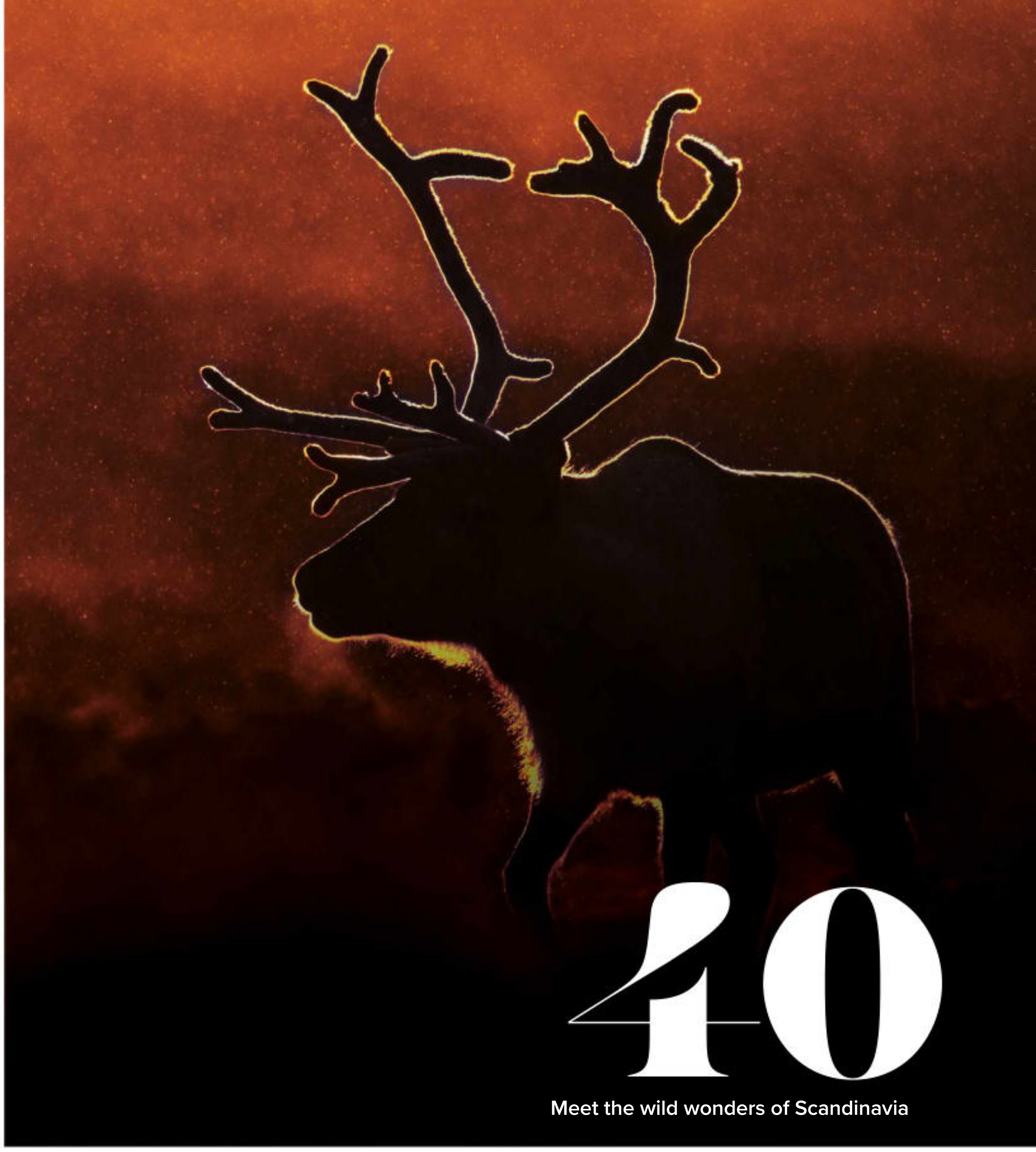
Herds of saiga antelope have returned to the Kazakh Steppe, but the response is mixed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Meet the wild wonders of Scandinavia

DON'T MISS...

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EMPEROR PENGUINS: STEFAN CHRISTMANN/NATUREPL.COM; REINDEER: FLORIAN SMIT; MANTIS SHRIMP: ALEX MUSTARD/NATUREPL.COM; DUSKY GROUPERS: JORDI CHIAS/NATUREPL.COM

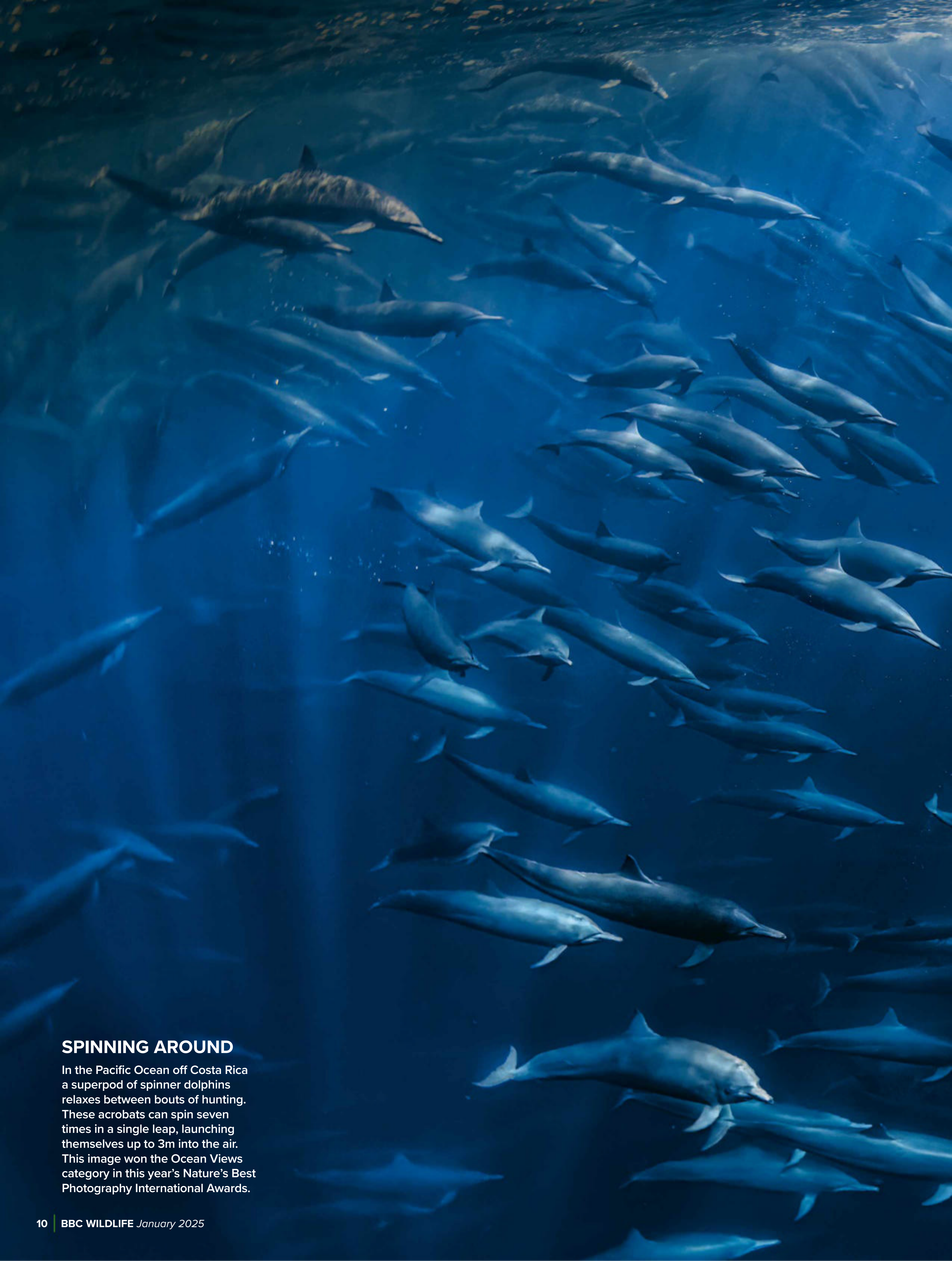
wild TIMES

The latest news, photography and seasonal wildlife highlights

GOLD RUSH

A male golden-tailed sapphire shakes down in the Sumaco National Park, Ecuador. These shimmering hummingbirds inhabit the edges of humid forests and plantations, and tend to forage for nectar in the canopy, with males sometimes gathering in 'quarrelsome assemblages'.

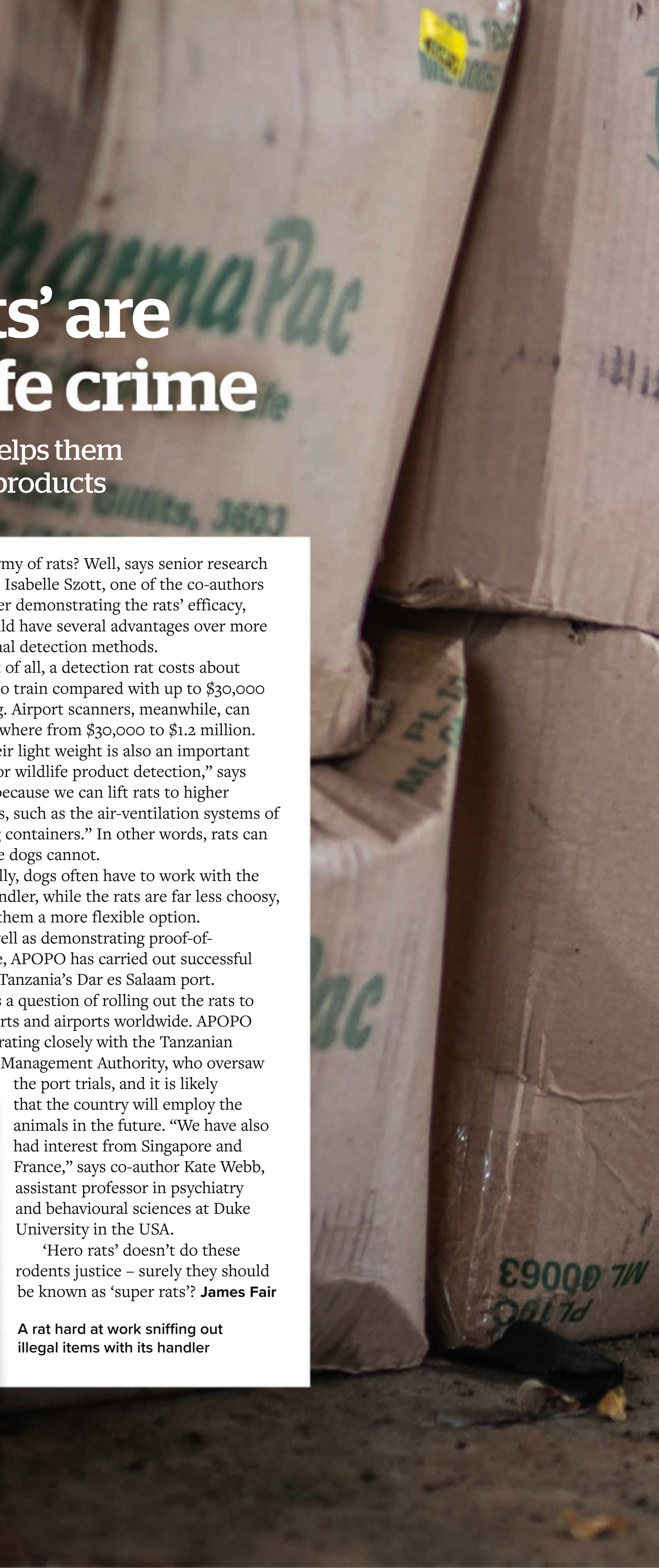
LUCAS BUSTAMANTE/NATUREPL.COM



SPINNING AROUND

In the Pacific Ocean off Costa Rica a superpod of spinner dolphins relaxes between bouts of hunting. These acrobats can spin seven times in a single leap, launching themselves up to 3m into the air. This image won the Ocean Views category in this year's Nature's Best Photography International Awards.

CÉCILE GABILLON/NBP 2024



Giant ‘hero rats’ are solving wildlife crime

The rodents’ super sense of smell helps them detect ivory, horn and other illegal products

NOBODY LOVES A DIRTY RAT, RIGHT? BUT what about an African giant pouched rat, a Goliath-sized rodent weighing 1.5-2kg (three to four times the size of our own brown rat) and native to the savannahs of southern Africa?

Over the past 25 years, these giant rats – known as ‘hero rats’ by the people who train them – have been used to detect deadly landmines and tuberculosis pathogens in medical samples.

Now, there’s even more reason to love these rodents – they could play an important role in fighting the illegal wildlife trade, thanks to their amazing sense of smell.

Research carried out by scientists from the non-profit group APOPO has demonstrated that giant rats can detect samples of elephant ivory, rhino horn, pangolin scales and African hardwood, even when these lucrative wildlife products are mixed with non-target items.

Of course, law enforcement officials already have high-tech scanners and detection dogs to help them in the fight against the multi-billion dollar illegal wildlife trade, so why the need for an army of rats? Well, says senior research scientist Isabelle Szott, one of the co-authors of a paper demonstrating the rats’ efficacy, they could have several advantages over more traditional detection methods.

First of all, a detection rat costs about $8,000 to train compared with up to $30,000 for a dog. Airport scanners, meanwhile, can cost anywhere from $30,000 to $1.2 million.

“Their light weight is also an important aspect for wildlife product detection,” says Szott, “because we can lift rats to higher locations, such as the air-ventilation systems of shipping containers.” In other words, rats can go where dogs cannot.

Finally, dogs often have to work with the same handler, while the rats are far less choosy, making them a more flexible option.

As well as demonstrating proof-of-principle, APOPO has carried out successful trials at Tanzania’s Dar es Salaam port. Now, it’s a question of rolling out the rats to other ports and airports worldwide. APOPO is cooperating closely with the Tanzanian Wildlife Management Authority, who oversaw the port trials, and it is likely that the country will employ the animals in the future. “We have also had interest from Singapore and France,” says co-author Kate Webb, assistant professor in psychiatry and behavioural sciences at Duke University in the USA.

‘Hero rats’ doesn’t do these rodents justice – surely they should be known as ‘super rats’? **James Fair**

RATS: APOPO

A rat hard at work sniffing out illegal items with its handler

The giant pouched rats have more olfactory receptors than sniffer dogs

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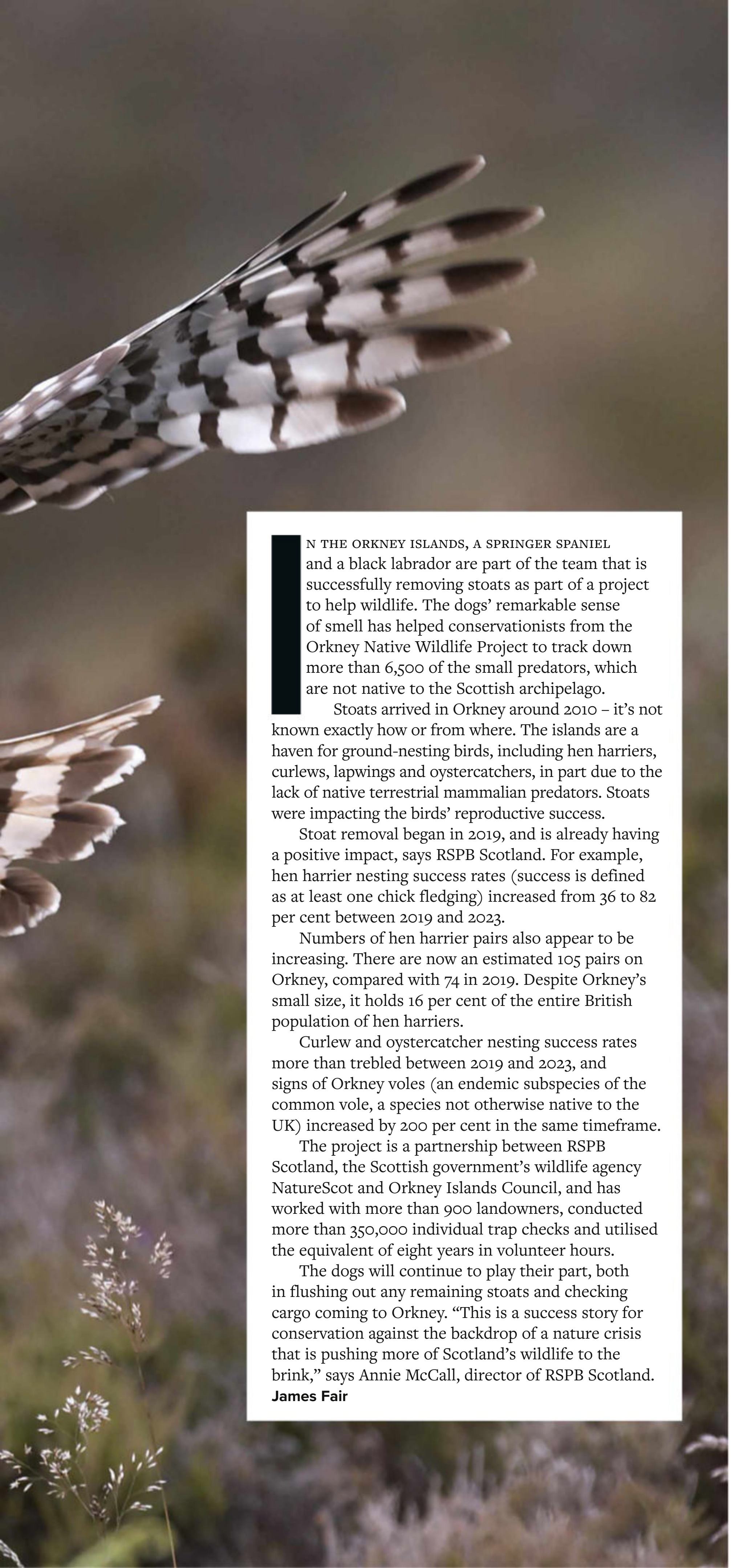
Calling in the canine crew

Ground-nesting birds are on the up in Scotland's Orkney Islands, thanks to man's best friend

Hen harriers breed on open moorlands but are rare in the UK



IN THE ORKNEY ISLANDS, A SPRINGER SPANIEL and a black labrador are part of the team that is successfully removing stoats as part of a project to help wildlife. The dogs' remarkable sense of smell has helped conservationists from the Orkney Native Wildlife Project to track down more than 6,500 of the small predators, which are not native to the Scottish archipelago.

Stoats arrived in Orkney around 2010 – it's not known exactly how or from where. The islands are a haven for ground-nesting birds, including hen harriers, curlews, lapwings and oystercatchers, in part due to the lack of native terrestrial mammalian predators. Stoats were impacting the birds' reproductive success.

Stoat removal began in 2019, and is already having a positive impact, says RSPB Scotland. For example, hen harrier nesting success rates (success is defined as at least one chick fledging) increased from 36 to 82 per cent between 2019 and 2023.

Numbers of hen harrier pairs also appear to be increasing. There are now an estimated 105 pairs on Orkney, compared with 74 in 2019. Despite Orkney's small size, it holds 16 per cent of the entire British population of hen harriers.

Curlew and oystercatcher nesting success rates more than trebled between 2019 and 2023, and signs of Orkney voles (an endemic subspecies of the common vole, a species not otherwise native to the UK) increased by 200 per cent in the same timeframe.

The project is a partnership between RSPB Scotland, the Scottish government's wildlife agency NatureScot and Orkney Islands Council, and has worked with more than 900 landowners, conducted more than 350,000 individual trap checks and utilised the equivalent of eight years in volunteer hours.

The dogs will continue to play their part, both in flushing out any remaining stoats and checking cargo coming to Orkney. "This is a success story for conservation against the backdrop of a nature crisis that is pushing more of Scotland's wildlife to the brink," says Annie McCall, director of RSPB Scotland. **James Fair**

Prince William talks to conservationist Robert Irwin while in South Africa

BBC **iPLAYER**

Catch up with *The Earthshot Prize* awards ceremony

Earthshot winners 2024

LAUNCHED IN 2020 BY PRINCE WILLIAM, The Earthshot Prize is a set of awards that recognises "game-changing innovations that will help us repair our planet", with winners each receiving £1 million to scale up their projects. This year's awards ceremony, held in Cape Town, South Africa, is currently available to watch on BBC iPlayer.

There are five 'Earthshots', which represent simple but ambitious and universal goals for 2030: Protect and Restore Nature; Clean our Air; Revive our Oceans; Build a Waste-Free World; and Fix our Climate.

This year's winners include the Altyn Dala Conservation Initiative, which works to protect Kazakhstan's Golden Steppe and its Critically Endangered saiga antelope (*read more on p72*); and Green Africa Youth Organization, which promotes circular waste management across the continent.

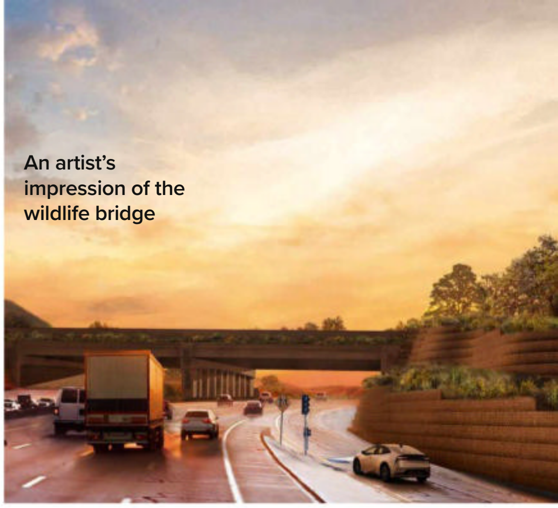
"I believe our world can be rich in possibility, in hope and in optimism," says Prince William in his closing speech. "That is why The Earthshot Prize exists, to champion the game-changers, to help them build on the amazing things they've already achieved, and to inspire the next generation to create the future we all need." **Cate Langmuir**

HEN HARRIER: PETE CAIRNS/NATUREPL.COM; PRINCE WILLIAM: CHRIS JACKSON/GETTY

BIG BLUE

The Azores has passed new legislation to create the largest Marine Protected Area (MPA) network in the North Atlantic. The MPA will cover 287,000km^2 of water around the Portuguese archipelago, protecting a wealth of marine life, including whales, sharks, rays and deep-sea corals.

Male dusky groupers fight for territory during mating season in the Azores



An artist's impression of the wildlife bridge

Colossal new crossing in California

World's largest wildlife corridor on track

THE WALLIS ANNENBERG WILDLIFE Crossing, construction of which started in April 2022, is now standing in Liberty Canyon, in California's Santa Monica mountains. This feat of sustainable engineering will reconnect habitats bisected by the 10-lane 101 Freeway, providing a living lifeline for the mammals and reptiles on either side. It's hoped the crossing will also act as a global model for urban wildlife conservation.

The bridge is being built mainly to protect California's mountain lions (also known as pumas and cougars), whose gene pool has been restricted by habitat fragmentation, but will also benefit a range of other species, from bobcats, coyotes, mule deer and black bears to desert cottontail rabbits, skunks, American badgers, California bats, Pacific gopher snakes and crocodile lizards.

And it's not just for fauna. Some 5,000 plants grown from seed collected within an 8km radius have been nurtured in two specially created nurseries, and will be planted on the bridge. These wildflowers, shrubs and grasses will support insect populations.

The first overland crossings appeared in France in the 1950s. Fortunately for wildlife isolated by roads or development, these vital lifelines are increasingly the norm, from elephant underpasses in Kenya to Christmas Island's red-crab bridges.

The California crossing is named after Wallis Annenberg of the Annenberg Foundation, which has been instrumental in coordinating funding for the $92 million project, in partnership with the National Wildlife Foundation and California Department of Transportation. Work is due to be completed in 2026. **Kirsten Henton**

WILDLIFE CROSSING: ROCK DESIGN ASSOCIATES AND NWF; DUSKY GROUPERS: JORDI CHIAS/NATUREPL.COM

Photo bombing

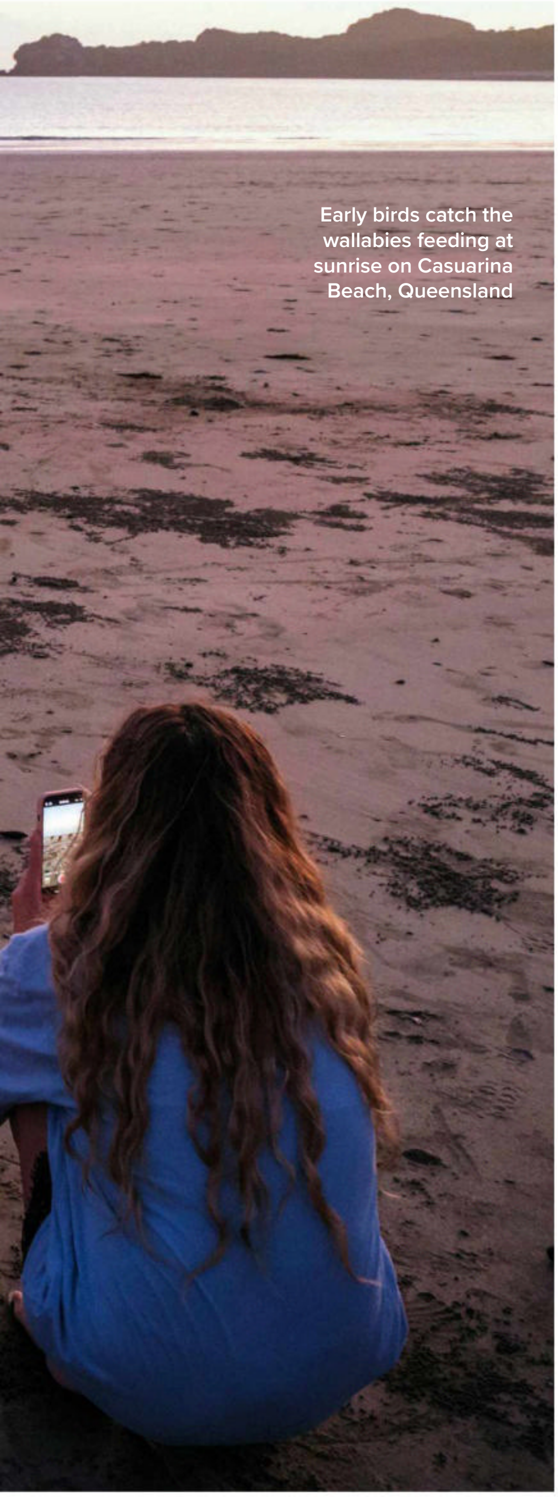
Wildlife is being harmed by our need to get the perfect shot – and share it

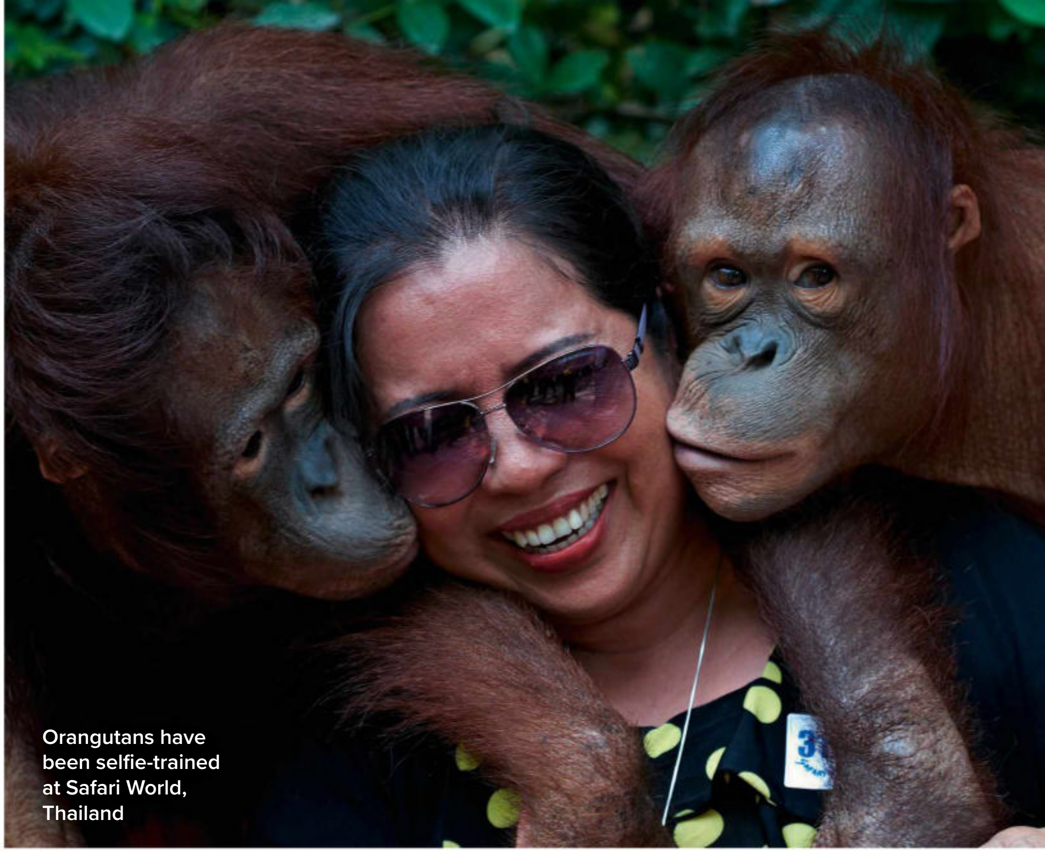
Jonathan and Angie Scott have been documenting the lives of predators in Kenya's Masai Mara since the late 1970s, with shows such as *Big Cat Diary* popularising the ecosystem and its world-famous wildebeest river crossings. There have always been tourists that break safari protocols, they say – standing on top of vehicles to get a better view of a big-cat kill or getting out of the Jeep at a river crossing to snap a selfie.

But two things have exacerbated the impact of this behaviour. One, the sheer numbers visiting the Mara every year; and two, our smartphones and how we use them. "Social media is turning us all into paparazzi," says Jonathan. "Images are so transitory – snap, forward to our feed and never look at that image again."

According to a group of Australian scientists, promoting wildlife experiences on social media – Facebook, Instagram, Twitter and, if you're young enough, TikTok – is now

> "There are videos of people flying drones around the heads of giraffes. The minority spoil it for everyone."


Early birds catch the wallabies feeding at sunrise on Casuarina Beach, Queensland


Orangutans have been selfie-trained at Safari World, Thailand

having a negative impact on the very wild species we claim to love.

Smartphones and social media heighten the 'honeypot' effect, says Rob Davis, a senior lecturer in vertebrate biology at Edith Cowan University in Western Australia, and lead author of a paper entitled *Liked to death: the Impacts of Social Media and Photography on Biodiversity.* They enable us to promote to thousands the delicate habitats or species that are unable to cope with the avalanche of visitors that this precipitates.

"Over the past five years things have got completely out of control with regulations not being enforced"

As an example, Davis cites a mind-numbingly rare orchid called the Queen of Sheba, which (partly due to habitat loss and fragmentation, and partly due to taxonomic splits) is now entirely restricted to a single site in Western Australia. When a Facebook group promoted this site to its 15,000 followers, the result was catastrophic.

"It became the worst-kept secret on the planet," says Davis. "Crowds of people went down and trampled the site, stopping any recruitment. Where there would have been 60-80 flowers left a decade ago, there are now just 27 for the whole species."

Davis accepts that neither photographers nor social media are the primary reason why this orchid is in such dire straits, but now that it is, something has to give. "We're at the point where we are better off not telling anyone about species like this because we are not seeing much evidence that humans can regulate themselves," he says.

In addition, smartphones give everyone who owns one access to technology that once would have been the preserve of only the most hardcore enthusiasts.

"Anyone can have a bird app with all the calls available to them," Davis points out. The use of callback – playing a bird's song to lure one into view – was once only used by serious twitchers. In Singapore, Davis watched people baiting a rare barbet to get a snap, shocked to realise they didn't know or care what it was, just that it was colourful.

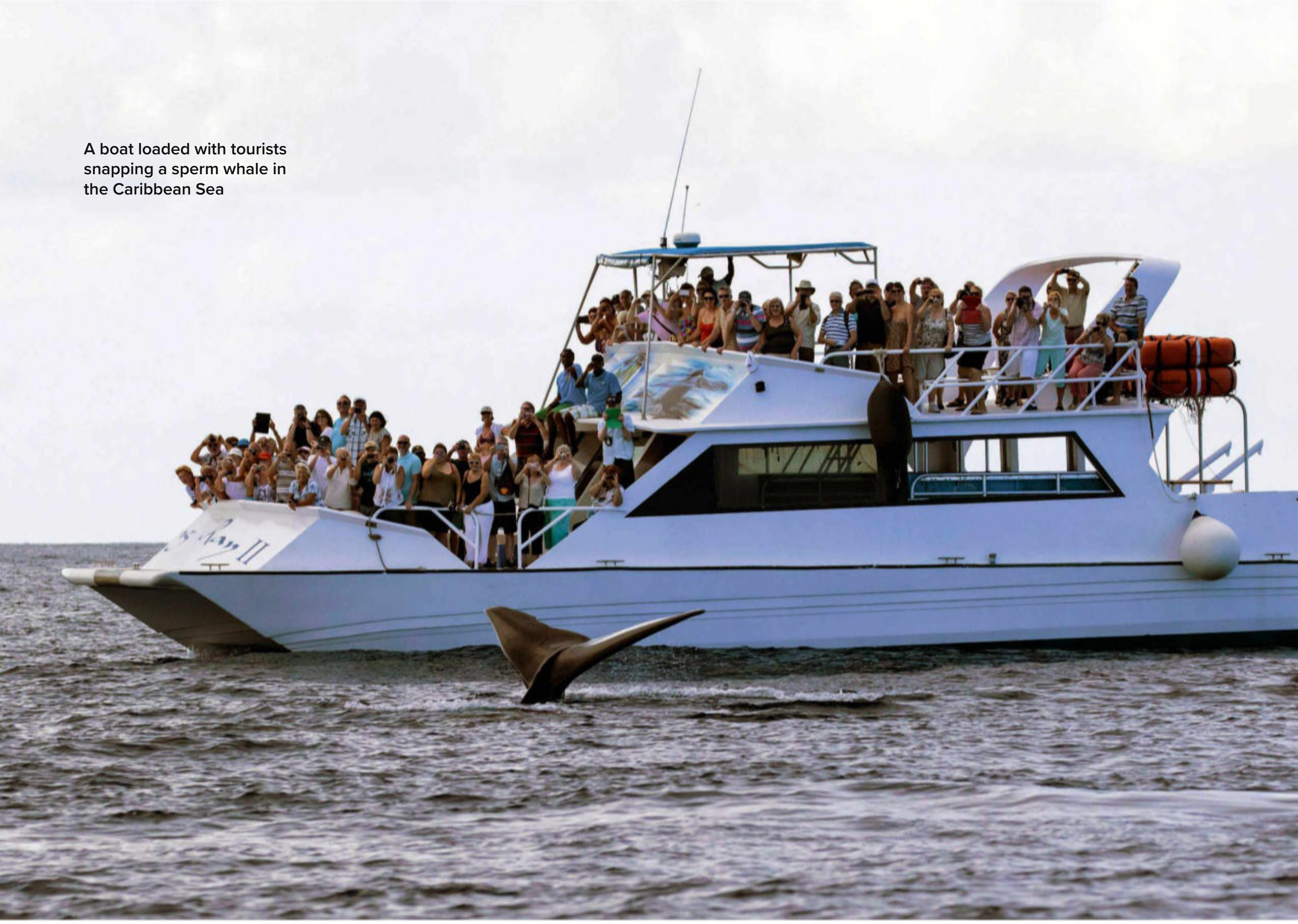
Environmental photographer Aaron Gekoski highlights how the development of smartphones and social media has led to other abuses not considered by Davis and his colleagues. "Social media can have negative impacts," he says. "Users share photographs of cruel wildlife tourism attractions, for example, while traders use platforms to sell endangered animals, and exotic pet owners flaunt animals that are often kept in inappropriate conditions."

HIS PHOTOGRAPH OF THE ORANGUTAN Ning Nong, taken at Safari World in Thailand, was commended in the 2024 Wildlife Photographer of the Year competition. As well as performing in 'shows', she is trained to pose for selfies with tourists, using methods that can involve corporal punishment and food deprivation.

Conservation group World Animal Protection has also highlighted the dangers of the animal selfie business in the Amazon Basin. It gives the example of sloths, who are snatched from their mothers when young, then kept in inhumane conditions to cater for what tourists may believe is a harmless photo opportunity.

Wildlife tour guide, photographer and *BBC Wildlife* columnist Mark Carwardine agrees that the advent of social media has changed people's behaviour. "It's made people more competitive, fighting over

TOURISTS AND WALLABIES: ROBIN WEAVER/ALAMY; ORANGUTAN SELFIE: RAY EVANS/ALAMY



A boat loaded with tourists snapping a sperm whale in the Caribbean Sea

> **"Social media enables us to promote to thousands delicate habitats that can't cope with an avalanche of visitors"**

how many followers they have, whereas previously they took photos for fun," he says.

Carwardine has stopped running trips to some areas where bad behaviour is now a regular occurrence. In recent years, Dominica has become well-known as a location for swimming with sperm whales, but he says it has become overrun with people seeking the experience – and image – of a lifetime.

"Over the past five years, things have got completely out of control, with regulations not being properly enforced," Carwardine says. "Boats zoom right up to the whales and everyone leaps in, sometimes jumping on top of them. There are still some responsible operators, but there are plenty of others who don't give a damn." Carwardine also reiterates the point that, on the whole, wildlife tourism is a positive thing. "If you stopped all tourism, it would be disastrous," he says.

Another relatively recent technological development is drones, increasingly used by professional wildlife photographers and natural-history film crews. Rob Davis's paper cites an earlier analysis that found in 61 per cent of videos assessed, the wildlife showed a negative response to the drone, including alarm-calling, evasion or even aggression towards the intruder.

"A few people using drones responsibly is fine, but a lot of people using drones irresponsibly is not," says Carwardine. "There are videos of people flying drones around the heads of giraffes, and they then run away." All national parks in the USA, and locations such as the Great Bear Rainforest in Canada, now have a blanket ban on drones. "It has to be done," he says. "The minority spoil it for everybody else."

Davis accepts that this is not an easy issue to resolve. He mentions another species of orchid so rare he won't identify it or disclose its location. "It's an absolutely stunning, orange-yellow flower," he says. His wife, Belinda Davis – an orchid scientist who works for Western Australia's Department of Biodiversity, Conservation and Attractions – says there are just two populations of the orchid, with no more than 20 plants in total.

When someone posted a photo of it on the Facebook group, the scientists were able to persuade the moderators to prevent the location being published before it was too late. But Davis also understands the itch others feel to publish images of incredible and rare wildlife.

"I have a photo of that particular orchid," he says. "I haven't shown it to anyone but I really want to, because it's so special. What's the point in having the photo if I can't show it around? However, I know that it's not in the interests of this species."

No doubt, most wildlife lovers can relate to this. Perhaps we need to learn to recognise when our behaviour could impact the wildlife we want to protect. After all, no one wants to be a 'scumbag' paparazzo, do they?

ABOUT THE AUTHOR

James Fair is a wildlife journalist with a specialism in conservation and controversial issues. Read more at jamesfairwildlife.co.uk.

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wild JANUARY

7 nature encounters for the month ahead

WITH NATURALIST AND AUTHOR BEN HOARE

1

The plumage is black-and-white in summer but more sandy and buff in winter

Snow time

Snow buntings are gorgeous little birds. They're also tough cookies that eke out an existence on windswept sand dunes and shingle beaches in winter. Somehow, they manage to find enough fallen grass and wildflower seeds to make it through. In Britain, most are visitors from Iceland and Scandinavia, and they tend to stick to Scottish and eastern coasts. When a flock of them take off, it looks like a flurry of snow.

Small fry

In temperate parts of the world winter is a time of deep rest for amphibians and reptiles, and for many invertebrates and plants, too. The change of pace can also profoundly affect our own rhythms, as Tiffany Francis–Baker explains in her illustrated guide to seasonal living, *Ebb and Flow*. "The quietude of winter is a message from the natural world," she says, "prompting us to slow down and restore our minds and bodies."

While lots of invertebrates survive winter by entering diapause, in effect a form of hibernation, some do remain active through the season. Among them are the springtails, which have six legs but are no longer considered insects. These ancient winged arthropods are tiny – most are no more than 4mm long – yet they can, counter-intuitively, be abundant during the coldest and darkest months. One frequently cited estimate suggests that there might be up to 100,000 springtails in each cubic metre of topsoil! They are scavengers and decomposers, most likely to be found among fallen leaves or in your compost heap.

2

Springtails have a jumping organ that can fling them to safety if attacked

3

Winter fuel

January days see an average of just eight hours of daylight in Britain, making life difficult for vitamin D-depleted humans. But spare a thought for small insectivorous birds such as wrens. Their limited fat reserves will barely sustain them overnight at this time of year, and this means that at first light they must begin a desperate race to feed up and refuel. In fact, it's more of a marathon than a sprint, because the wrens continue foraging pretty much non-stop until they finally head to roost in the late afternoon.

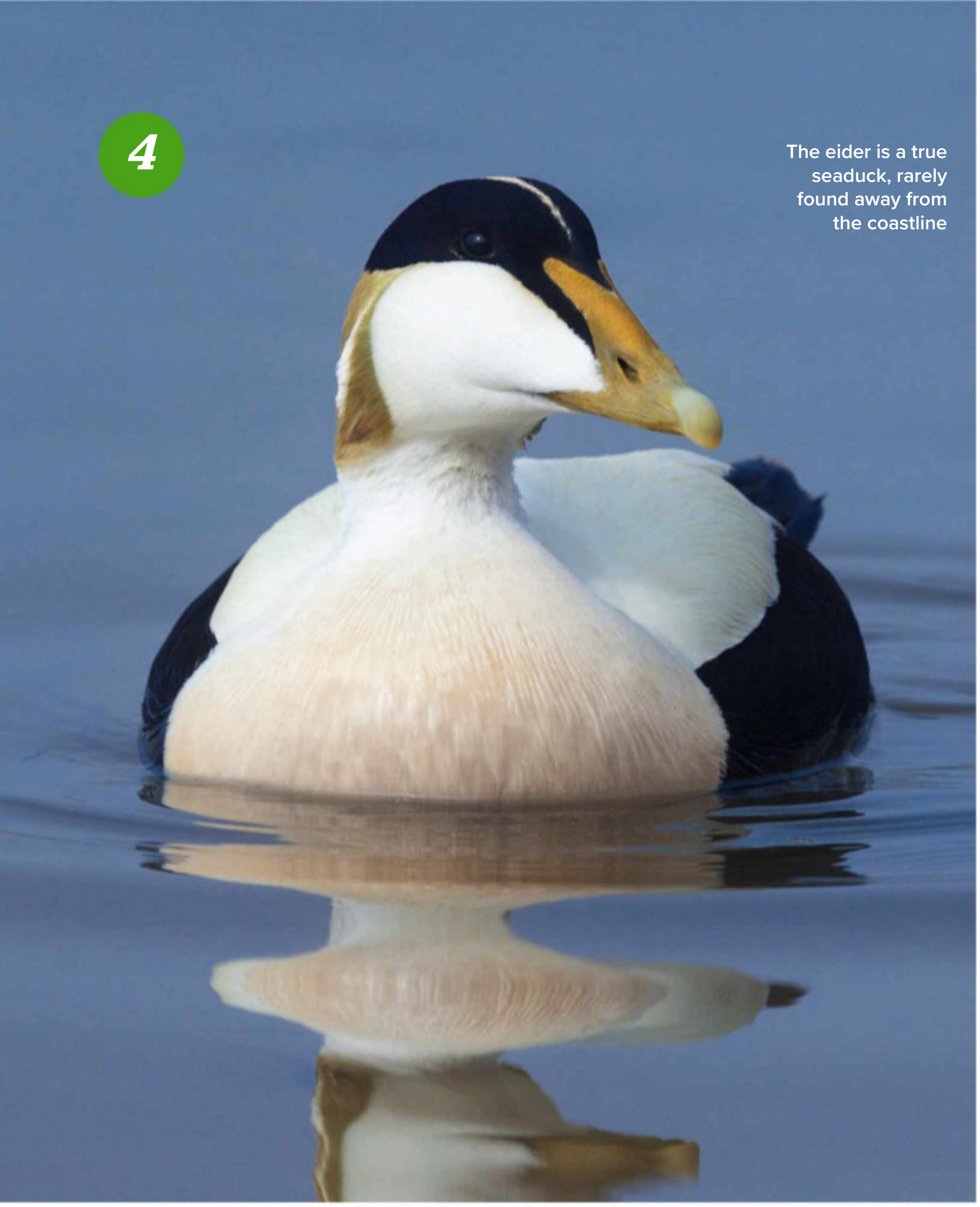
Wrens specialise in hunting small invertebrates, which include spiders and winter-active flies. But with this prey scarce, they often switch to eating seeds as well. Sometimes wrens will take scraps from bird feeders, and like to glean the crumbs that bolshier birds such as robins and starlings drop when feeding from fat balls.

Milder winters may help our wrens, but climate change might also disrupt their food source and habitat in ways we do not yet appreciate.

For such little birds, wrens are incredibly loud

SNOW BUNTING: ERNIE JANES/NATUREPL.COM; SPRINGTAIL: ALEX HYDE/NATUREPL.COM; WREN: MARK HAMBLIN/RSPB-IMAGES.COM

4

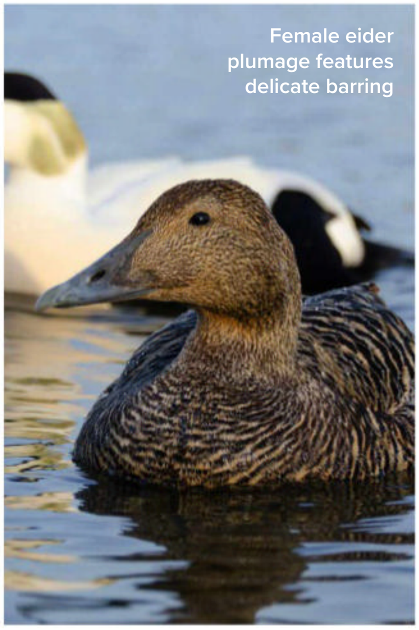


The eider is a true seaduck, rarely found away from the coastline

Ducking and diving

MALE EIDERS ARE SURELY AMONG THE most handsome ducks in the northern hemisphere, sporting a bold combination of black and white, offset by a subtle rosy flush on their breast and a pistachio-green patch on their nape. In the winter months, they gather in flocks known as 'rafts' on rocky northern coasts, together with the plainer brown female ducks.

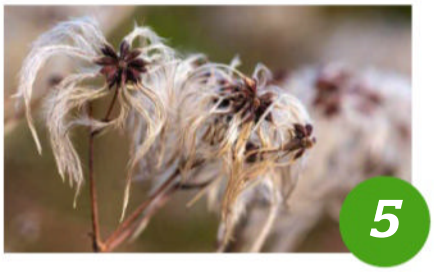
By January, eider drakes have already started to display to would-be partners, using extraordinary crooning calls to get their attention. If you haven't heard this wonderful and (to our ears) rather comical sound, have a listen online – you won't be disappointed!



Female eider plumage features delicate barring

ABOUT THE AUTHOR

Ben Hoare is a wildlife writer, editor and all-round 'nature nerd'. He also writes highly acclaimed illustrated natural history books for children.



5

Joyful climber

Also known as old man's beard or woodbine, traveller's joy is a climbing plant common in hedges and scrubby woodland edges. In the middle of winter, its seedheads look like clusters of wispy grey feathers and are very eye-catching – people once used them as Christmas decorations.

6

Red alert

January and February is mating season for red foxes. Vixens let out bloodcurdling cries to attract dog foxes, and these are often heard in the dead of night and sound quite human-like, so can be unnerving for anyone not familiar with them. The cubs will be born in March and April.

7

Pretty in pink

The New Year Plant Hunt, organised by the Botanical Society of Britain & Ireland, is now firmly established in the nature-watching calendar and the next one is from 29th December 2024 to 1st January 2025. Look out for the pink star-shaped flowers of herb-robert, among other hardy flora.

MALE EIDER: ALEX HYDE/NATUREPL.COM; FEMALE EIDER: ROLAND SEITRE/NATUREPL.COM; TRAVELLER'S JOY: TOM MEAKER/ ALAMY; RED FOX: ALAMY; HERB ROBERT: STEPHEN DALTON/NATUREPL.COM

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OPINION

GILLIAN BURKE

"We have always been fascinated by the efficiency of social insects"

"MY HEAD HOVERED JUST INCHES above the Lilliputian tunnel entrance for a close-up view. As long as I held my breath, the termite workers seemed happy to carry on with their chores, using their dainty mouthparts to mix, knead and mould the ochre-red mud into tiny, dough-like balls, pressing them into place as they constructed a new section of trail.

Eventually, though, I had to breathe. As I exhaled, a warm puff of air betrayed my presence to the soldiers, who came pouring out to wave their oversized heads and fierce-looking mandibles, signalling that I was too close. No bother. All I had to do was back off slightly, and both workers and soldiers settled down once more. Termite-watching could resume.

Termites and other social insects are referred to as 'superorganisms' due to their impressive collective behaviour. Working together, they achieve outcomes greater than the sum of their parts. From termites building trails to bees constructing honeycomb and ants clinging to one another to form 'living bridges' in the face of obstacles, social insects have a remarkable ability to organise and coordinate their behaviour, without any individual seeing or understanding the bigger picture.

Ants, in particular, get a special mention in the Bible's Book of Proverbs. "Go to the ant, you sluggard; consider its ways and be wise," one verse reads, noting the fact that ants have "no commander, no overseer or ruler, yet store provision in summer and gather food at harvest."

It's likely that we have always been fascinated by the self-organising efficiency of social insects, whether as early humans out foraging for honey or raiding ant nests for juicy grubs, or later, when their behaviour inspired the mathematical modelling behind telephone networks, traffic-flow systems and even opinion polling. Their ability to organise without the need for top-down control has long impressed us, and their influence continues right into the digital age.

In the initial rollout of the World Wide Web (complete with its quaint-looking logo of the early 90s and the noble tagline "let's share what we know"), the need to network vast telecommunications and electronics systems so that billions of people could interact over the internet had us turning once more to the "little creatures that run the world" as the pioneering entomologist, the late EO Wilson, referred to social insects.

Hidden in every natural detail, from each twist, turn and fork in a termite trail to the synchronised flashes of fireflies at night, is the promise of greater efficiency in digital networks. But therein lies the trap.

The 19th-century English economist William Stanley Jevons observed that as coal-fired steam engines became more efficient, rather than reserving this new technology for a few high-value tasks, it was deployed for a myriad of tasks, increasing the net consumption of coal in the long run. This phenomenon, known as the Jevons Paradox, is still at play. Digital technology and artificial intelligence (AI) is becoming more energy- and resource-efficient thanks, in part, to the lessons learned from social insects, but these gains could be cancelled if the technology is peppered too liberally. We know that the energy used for digital technology has a significant carbon footprint – be it in the manufacturing of devices such as smartphones or the powering of data centres.

The natural world is full of solutions to human problems, but we must be prepared to learn all that nature has teach us, including staying within planetary boundaries no matter how clever we get. Ⓦ

Gillian Burke is a biologist, writer, film-maker, TV presenter and podcaster. She joined the BBC Two *Watches* team in 2017.

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FEMALE OF THE SPECIES

— DOLPHINS —

Meet the sponge-wearing social circle

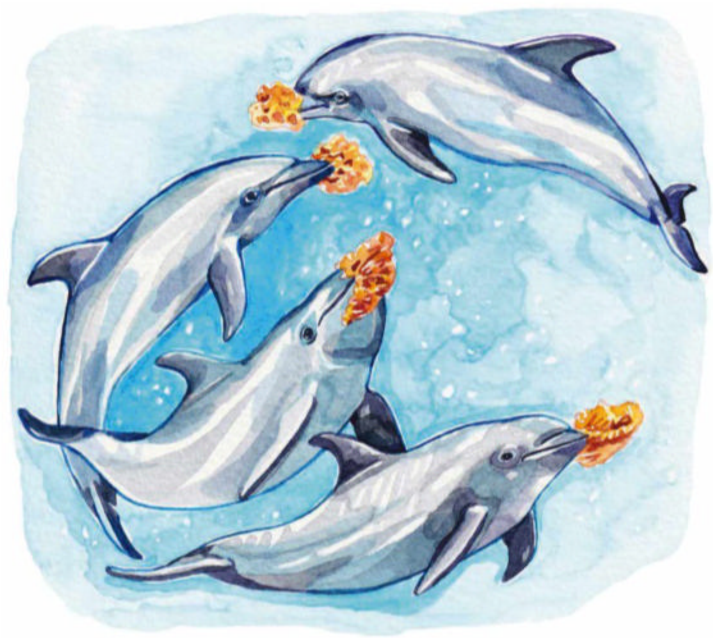
TO SPONGE OR NOT TO sponge? That is the question for the bottlenose dolphins (*Tursiops aduncus*) living in Shark Bay, Western Australia.

These super-smart cetaceans have learnt a crafty trick when foraging for grubfish, which hide away on the seabed. To locate this cryptic prey, they use their snouts to probe the sand and encourage the fish to reveal themselves. A dolphin's snout, or rostrum, is packed full of nerve endings and extremely sensitive to touch. So, sifting through grit must be an irritating occupation. Which is why some dolphins have started wearing marine sponges for protection.

This functional fashion was first recorded in 1995 in five dolphins. It caused a scientific stir as the only known instance of tool-use by dolphins in the wild. Since then, 'sponging' has spread to one third of the dolphin population. Scientists at the Shark Bay Dolphin Research Project have been trying to figure out how this ingenious culture is transmitted, and why it's mostly females that take it up.

Shark Bay is a vast area – around 13,000km² – and is home to around 1,000 dolphins. Researchers have been gathering data on their complex social lives for the past 40 years. They even have a book of mugshots to identify each dolphin using distinctive individual features, such as scars from shark attacks.

Researchers discovered that spongers always had a mother who sponged. Around 91 per cent of female calves adopt sponging from their mothers, while only 50 per cent of males did. Males, it transpires, are more interested in spending their time forming coalitions with other males. These relationships form a key part of their mating strategy, which involves herding females and coercing them into sex. So, males start investing in these alliances from an early age.



The female bottlenose dolphins of Australia's Shark Bay have a nifty trick to protect their precious snouts while feeding

Juvenile females, on the other hand, spend less time interacting with other females and more time practising their hunting techniques. Dolphins in Shark Bay have a long period of maternal investment. Calves in the population will nurse anywhere from two to eight or more years. So, it pays for females to learn the necessary skills to hunt enough food for two.

Using cutting-edge social network analysis, researchers discovered that females exhibit a lot of variation in their social relationships. Some are super-social, with dozens of close friendships, while others have none.

Researchers found that the non-spongers were the social butterflies of Shark Bay, with dozens of friends and casual connections, whereas the spongers tended to be less social. Sponging is a solitary sport, which means the females that specialised in this mode of hunting tended to spend more time alone.

There was one social metric that the spongers scored highly on, however: cliquishness. Spongers went out of their way to socialise with other spongers. Curiously, when they did so, they also wore their sponges.

These groups of females sporting sponges weren't foraging, they were just hanging out. So, what was the point of these sponge-wearing parties?

Shark Bay females take their choice of sponge seriously. Sometimes they'll spend 10 minutes searching for a sponge that is just the right shape. They pry basket sponges from the seabed and wiggle their snouts inside, to find the right fit. It's as if they're shopping for the perfect shoe.

Researchers realised that the sponge-wearing meet-ups were important networking events for these working mothers. They helped spread this unique culture by enabling females to share information about where to find the best selection of sponges.

Lucy Cooke is a broadcaster, zoologist and author of *Bitch: What Does It Mean To Be Female?* (The Penguin paperback is on sale now)

BBC SOUNDS

Catch up with Lucy's three-part BBC Radio Four series, *Political Animals*

ILLUSTRATION BY HOLLY EXLEY

Colonies of chinstrap penguin – a case-study species in the 2024 Living Planet Report – have declined on average by 61 per cent from 1980-2019. The loss is due to changes in sea ice and reduced krill prey as a result of climate change and increased fisheries.

YVA MOMATIUK & JOHN EASTCOTT/NATUREPL.COM

OPINION

"Governments have never met a single biodiversity target in the history of UN agreements"

MARK CARWARDINE

I HAVE A DREADFUL ADMISSION TO MAKE. I feel gripped by a sense of doom like never before. I'm struggling not to slip into total despair. The latest research reveals that we have lost nearly three-quarters of the world's wildlife in the past 50 years. How can such a staggeringly catastrophic decline fail to make headline news around the world? How much worse does it have to get before everyone wakes up and takes notice?

You'd have thought the powers-that-be would take it more seriously. Yet this jaw-dropping annihilation is only going to get worse – as global heating accelerates, as business continues as usual and as governments repeatedly fail to give a damn.

> **"Why are conservationists still being ignored, as if saving life on Earth is an optional extra?"**

The World Meteorological Organization recently announced that the greenhouse gases in the atmosphere have reached a record high and carbon dioxide is accumulating faster now than at any time in human existence. And that's despite all the publicity and promises.

Meanwhile, the COP16 biodiversity summit, held in Colombia in October, was striking for its gross underachievement. Two years earlier, at COP15 in Montreal, the world reached an historic agreement to protect 30 per cent of the planet for nature by 2030 and to phase out or reform US$500bn of environmentally damaging subsidies. Yet no fewer than 158 nations (out of 196) arrived at the summit without formal plans on how they are going to meet these targets. But then why should we be surprised? Governments have never met a single biodiversity target in the history of UN agreements.

Why are conservationists still being ignored, as if saving life on Earth is an optional extra? Why is the world so woefully and bizarrely unenthusiastic when it comes to avoiding mutual destruction? It doesn't help that environmentally friendly and scientifically astute politicians are themselves an endangered species. Most politicians are obsessed with reckless short-termism. If the planet becomes uninhabitable after their brief spell in office, so be it (I'm not being melodramatic – a group of 80 researchers from 45 countries issued a warning this week that the planet is, indeed, becoming increasingly uninhabitable).

We are failing miserably, and it's terrifying. Yes, we are slowing the decline (without conservation, our plight would be far, far worse). And, yes, there are success stories. But many don't even register on the scale of destruction, and many others are merely hot air – promises that are never kept.

There were even positive murmurings about the Living Planet Index, focusing on the figures for Europe (where we've lost 35 per cent of our wildlife populations since 1970) and North America (39 per cent lost). But there's a reason our losses are relatively low: we'd already wiped out much of our wildlife by the time these records began. Besides, who in their right mind would celebrate the fact that we have lost 'only' 35 per cent or 39 per cent of all our wildlife in 50 years?

I know that we are all wired to try harder when there are reasons to be cheerful. Some people argue that conservationists have become too pessimistic for our own good. We don't want the constant pessimism to cause everyone to tune out. But it's equally irresponsible to lull people into a false sense of security. The comment we hear time and again – "It's not too late; if we act now, nature can recover" – is sounding increasingly vacuous.

AT A GLANCE

- Recent research reveals that global wildlife populations have plunged by an average of 73 per cent in the past 50 years (1970–2020). Latin America and the Caribbean recorded the steepest average declines – a staggering 95 per cent – with Africa second at 76 per cent.
- The figures were published in the 2024 Living Planet Report, a biennial report measuring the state of the world's biological diversity, produced by WWF and the Zoological Society of London.
- Meanwhile, the COP16 biodiversity summit took place in Colombia, where delegates from 196 countries discussed progress in preserving biodiversity and stopping the destruction of nature – but, yet again, the political pace failed to match the scale of the challenge.

Don't get me wrong. I'm not about to hang up my conservation hat just yet. I get that fighting against the intractable forces of bureaucracy, greed, conflict and ignorance is in the job description. We live it each and every day. But it is increasingly difficult not to be overwhelmed by a sense of grief and failure when your days are filled with cajoling and battling – and you're constantly beleaguered by bad news.

But, first, I need to calm down, in the best way I know. By spending some time outside in nature. What's left of it.

Want to comment?
Share your thoughts on Mark's column by sending an email to wildlifeletters@ourmedia.co.uk

Mike Dilger's

WILDLIFE SPECTACLES

The broadcaster, naturalist and tour guide shares the most breathtaking seasonal events in the world

LET'S GET TOGETHER

MACAWS AT A LICK

Clay licks deep in the Amazon explode in a riot of colour, with macaws the stars of the show

It may be the world's largest and most biodiverse ecosystem, but it can be surprisingly difficult to see much in the Amazon. The majority of species are placed firmly in the 'shy and secretive' category, and even spotting birds is tricky, given the dense nature of the forest foliage. However, if you like your fauna to put on a show, worry not. Select sites along the western reaches of the Amazon basin host a dazzling phenomenon that is the ornithological equivalent of shooting fish in a barrel.

Blue-and-yellow macaw

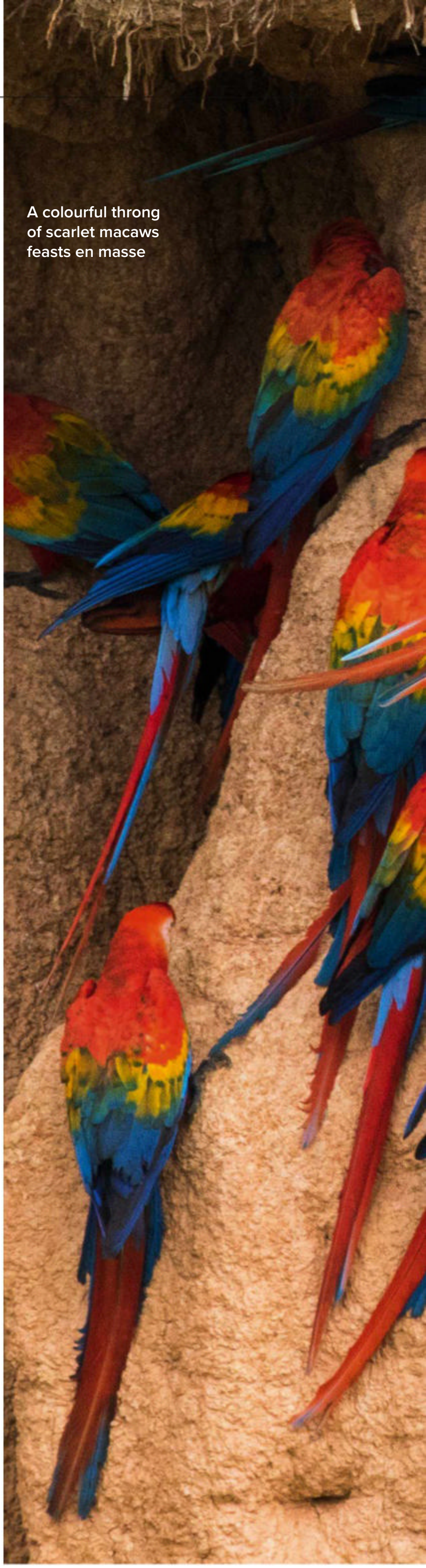
Described by researcher Elizabeth Hobson as "a crazy, screaming kaleidoscope of colour," the spectacle of scarlet macaws and other parrot species breaking cover and descending en masse to feed along eroded, clay-rich cliffs and riverbanks (known as 'clay licks' or *collpas*), presents the opportunity to boost your bird list while revelling in some fascinating behaviour.

Every day, in the early morning, up to 20 species fly in from as far as 20km away to feed at these mineral-rich clay licks. The larders are often located on the outer bends of meandering rivers, where erosion has exposed seams of clay in the soil, and only a few appear to meet the parrots' dietary needs.

The practice of eating clay and other soil-derived substances, known as geophagy, is well known. But the precise reason why

Did you know?

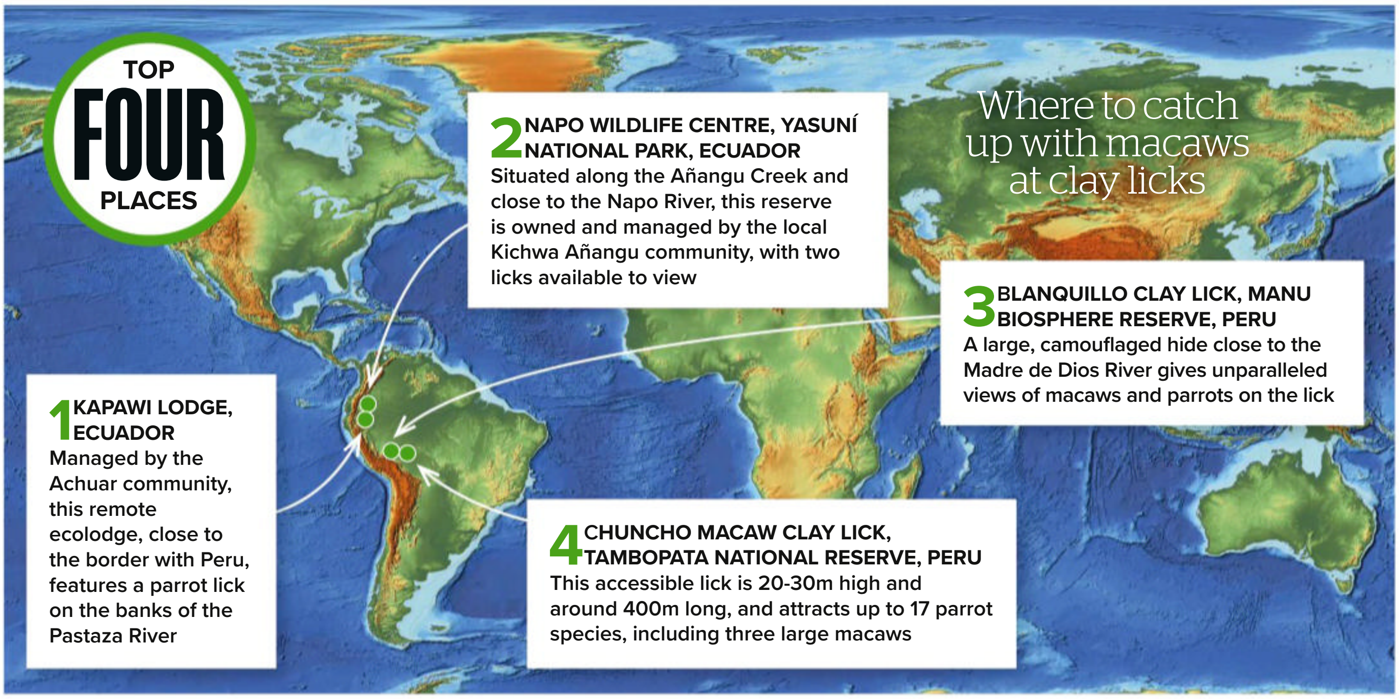
Macaws feed large amounts of clay, through regurgitation, to their chicks. The youngsters need the sodium in the clay for the development of bone, muscle and nervous and circulatory systems.



A colourful throng of scarlet macaws feasts en masse

BLUE AND YELLOW MACAW: SHAHZAD SIDDIQUI/GETTY;
SCARLET MACAWS ON CLIFF: MAXIME ALIAGA/NATUREPL.COM

“What initially seems a chaotic free-for-all actually has some semblance of structure”



TOP FOUR PLACES

Where to catch up with macaws at clay licks

1 KAPAWI LODGE, ECUADOR
Managed by the Achuar community, this remote ecolodge, close to the border with Peru, features a parrot lick on the banks of the Pastaza River

2 NAPO WILDLIFE CENTRE, YASUNÍ NATIONAL PARK, ECUADOR
Situated along the Añangu Creek and close to the Napo River, this reserve is owned and managed by the local Kichwa Añangu community, with two licks available to view

3 BLANQUILLO CLAY LICK, MANU BIOSPHERE RESERVE, PERU
A large, camouflaged hide close to the Madre de Dios River gives unparalleled views of macaws and parrots on the lick

4 CHUNCHO MACAW CLAY LICK, TAMBOPATA NATIONAL RESERVE, PERU
This accessible lick is 20-30m high and around 400m long, and attracts up to 17 parrot species, including three large macaws

the parrots return so faithfully for their daily mineral fix has been the subject of much debate, with two theories rising to the fore.

The 'detoxification theory' speculates that clay neutralises the alkaloids (tannins, quinine and strychnine) in the seeds and unripe fruit that parrots regularly consume. However, despite the fact that parrots all over the world have similar diets, geophagy has only ever been observed in Bolivia, western Brazil, Colombia, Ecuador and Peru.

The second and currently favoured theory comes from researchers at the Tambopata Macaw Project in Peru, who have used data going back 16 years to revisit an earlier theory that the clay might be providing something missing from the parrots' diet. Analysing the soil from these seams, the scientists discovered very high levels of sodium. This element is critical to many processes in the parrots' physiology, but is in decidedly short supply in their forest home, far from any ocean. Their research also revealed that the parrots' consumption of clay appeared to closely correlate with each species' breeding season – peaking in December and January for scarlet and red-and-green macaws.

Observing a feeding event at a lick offers an interesting window into parrot life. Leaving the trees for the open cliff face exposes the birds to aerial predators, so the first individuals descend with understandable trepidation. While it's safer to arrive late to the party, the downside is more intense competition for a place at the table.

> "It can take one alarm call for all birds to take to the air in a panicked exodus"

Watch the activity closely and you'll realise that what initially seems a chaotic free-for-all actually has some semblance of structure. The smaller macaws and larger parrots tend to feed first, with the larger macaws rather more circumspect and only joining when the coast is clear.

Flocks of parakeets and smaller parrot species are also a common component of the avifauna at a lick, and congregations often wheel around the cliff face before joining the melée. Sometimes larger species displace smaller ones, but the tables can turn if a dense flock of smaller birds reaches a critical mass. To add to this, there is a constant and collective nervousness at a lick – it can only take one single parrot's alarm call for all birds to swiftly take to the air in a panicked exodus known as a 'dread', before they all eventually settle back down to feed.

Whatever avian behaviour you might witness at a lick, one thing's for sure: it will be a chaotic, colourful and unforgettable extravaganza.

Macaws are rarely found alone, preferring to raise a ruckus in groups

LOOK CLOSER

A noisy affair

Most parrots are communicative and noisy birds. With practice you should be able to start differentiating between the various groups. The sounds range from the deep, throaty roars and squawks of the macaws to the high-pitched screeches of the parakeets.

Mammal drop-in

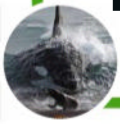
Clay licks are not just a magnet for parrots, but also a range of mammals. Brocket deer, collared peccaries, capybara and even lowland tapirs have been known to turn up, with dawn and dusk being the best times to see them.

A visiting capybara

The early bird catches the macaw

For reasons not entirely understood, early morning visits to the licks tend to yield both a higher number of parrots and a wider range of species. Try to pick a sunny day, as the parrots don't like being on the cliff face in the rain, possibly due to the enhanced risk of landslides.

NEXT MONTH



Orcas beaching to snatch sealion pups from the shore

FLYING MACAWS: GETTY; CAPYBARA: DAVID TIPLING/ALAMY; ORCA: SYLVAIN CORDIERNATUREPL.COM

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HIDDEN WORLD

The popular naturalist, author and TV presenter reveals a secret realm of overlooked wildlife

ROLLING IN THE DEEP

GIANT ISOPOD

The super-sized crustacean that lives in the deepest, darkest ocean

Just imagine a world where familiar minibeasts were not so small; where you could really appreciate their marvellous micro-mechanics and delicious details without needing a magnifying lens. You might think that a woodlouse the size of a cat is in the realm of *Honey, I Shrunk the Kids* science fiction, but it does in fact exist – not under a flowerpot in your garden, but in the cold reaches of the world's oceans.

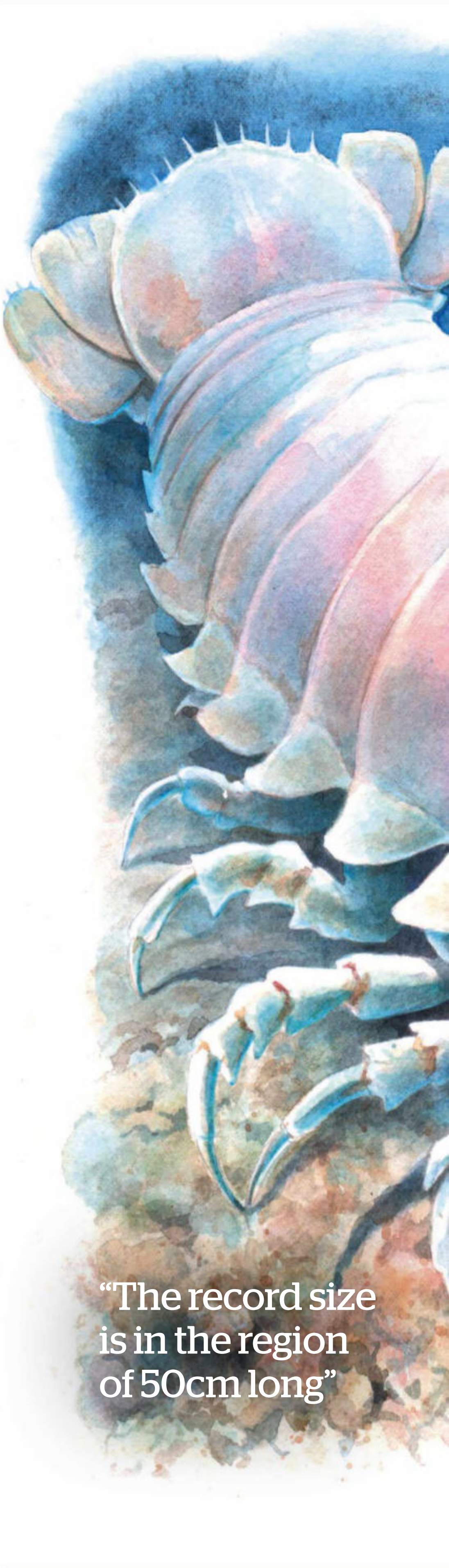
The giant isopod (*Bathynomus giganteus*) isn't exactly a woodlouse, but there are many parallels. They both have a hard exoskeleton, 14 walking legs, and gills, and share a similar lifestyle, which is mostly a relatively sedate and simple affair.

The largest of about 20 species in the genus *Bathynomus*, the giant isopod lives at depths of around 2km beneath the ocean's surface where it's dark and cold. Here, it trundles around the 'abyssal plain' – vast deserts of soft silt – along with a collection of other deep-sea specialists, and makes a living in much the same way as its more familiar terrestrial cousins: by cleaning up.

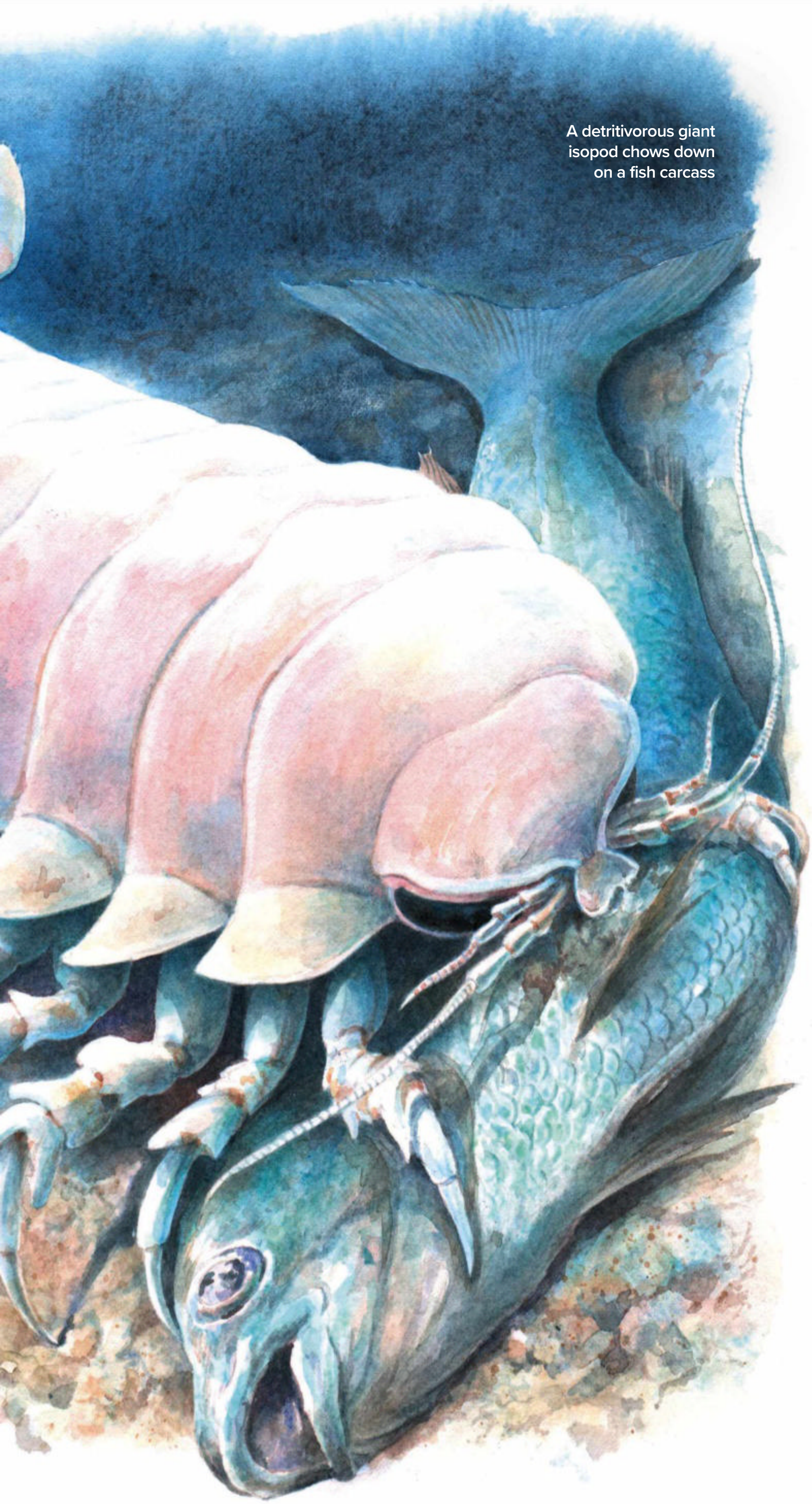
Investigations of the gut contents of those unfortunate enough to have been dragged from the depths, along with footage from underwater remotely operated vehicles (ROVs), tell us that this aquatic crustacean is primarily a 'detritivore'. It mostly feeds on dead animal material that has fallen from above and has been recorded scavenging on anything from whales to cephalopods. That said, it also probably actively predates anything it can overpower, such as worms and molluscs. There is even surprising footage of them latching onto the heads of small sharks!

The giant isopod finds its food in the dark with the help of highly sensitive antennae, in much the same way that terrestrial woodlice locate detritus under a log or stone (where it is equally dingy). It has two pairs: a long pair that 'feels' as they constantly sweep the substrate in front of them, and a short pair that are held aloft detecting tell-tale chemical 'tastes' in the water.

With a common name comprising the word 'giant', it comes as no surprise that this isopod can grow to a surprisingly substantial size. The record is in the region of 50cm long, with unsubstantiated claims of individuals even bigger. What they are exhibiting is abyssal or deep-sea gigantism, the tendency of deep-dwelling animals to



"The record size is in the region of 50cm long"



A detritivorous giant isopod chows down on a fish carcass

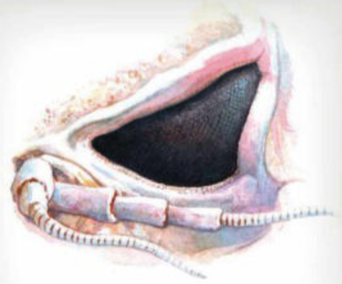
be much larger than their shallow-water counterparts, from sea spiders to squid. This phenomenon isn't well understood, mainly because it is difficult to carry out studies at these depths, but it is thought that being big confers several advantages.

One theory suggests that abyssal gigantism is due to the more significant amounts of dissolved oxygen available to animals at depth. In contrast, the size of terrestrial invertebrates is thought to be limited by the lower atmospheric oxygen levels, combined with their limited ability to absorb oxygen into their bodies as they don't possess lungs. That's why we don't have beetles the size of basketballs.

The other theory is that the abyssal plains are vast, and animals that live here must be able to survive for long periods without encountering food (one giant isopod kept in an aquarium went four years without eating). A large body means you can effectively 'cash in' – stuff yourself when the opportunity arises and store those resources. When individuals do eat, they often consume so much that they can't move, which leads to another possible explanation for deep-sea giants: the bigger you are, the fewer predators will be able to tackle you.

Isopods (in the genus *Bathynomus*) have specialised legs towards the back of their bodies called pleopods, used for swimming and also as gills. Woodlice have these, too, and must keep them damp to be able to breathe.

LOOK CLOSER



A close-up of a giant isopod eye

Bright eyes

Species from the genus *Bathynomus* have remarkable compound eyes, each bearing 3,500 facets. They are highly reflective and appear to glow due to a mirror-like 'tapetum', a reflective membrane behind the retina that allows them to capture stray photons of light more efficiently, enhancing the aquatic crustaceans' visual sensitivity. It is a similar adaptation to that found in nocturnal mammals that must also seek food in the dark.

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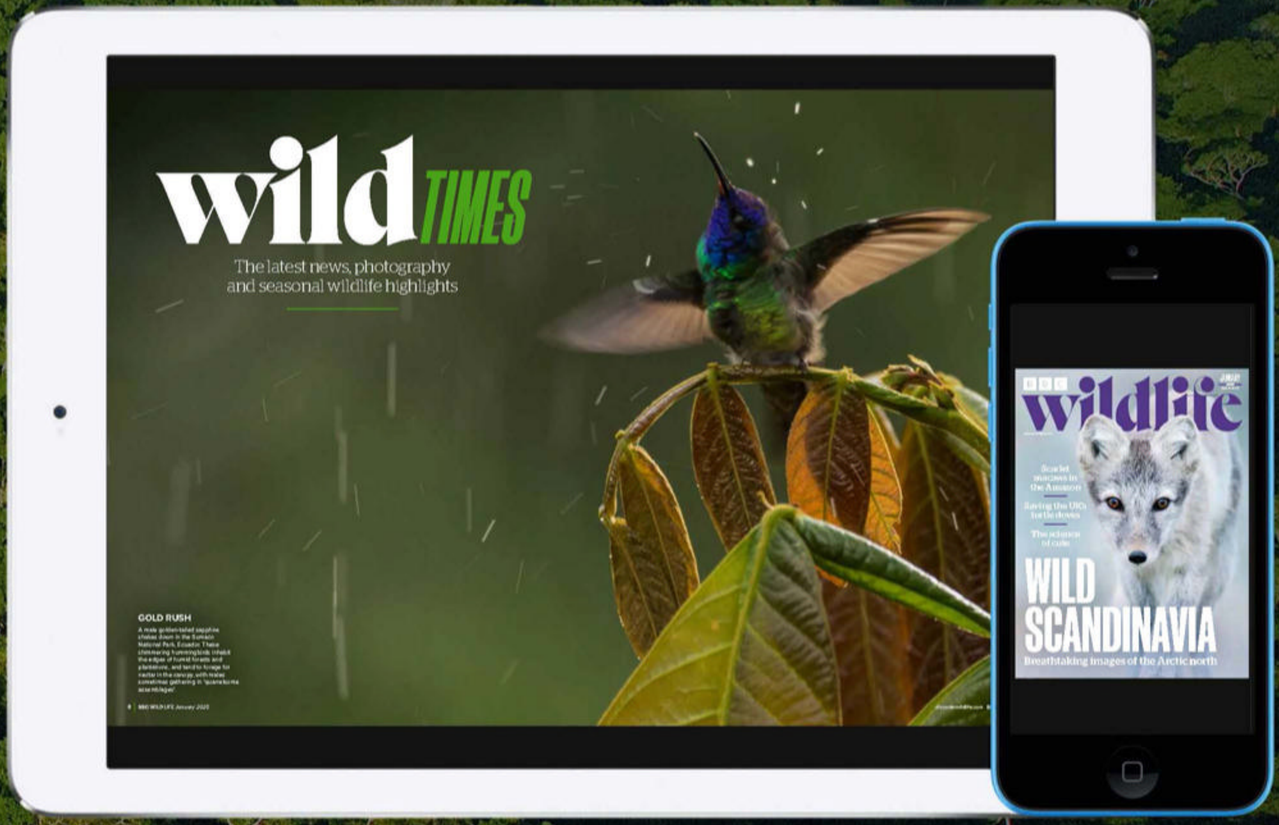
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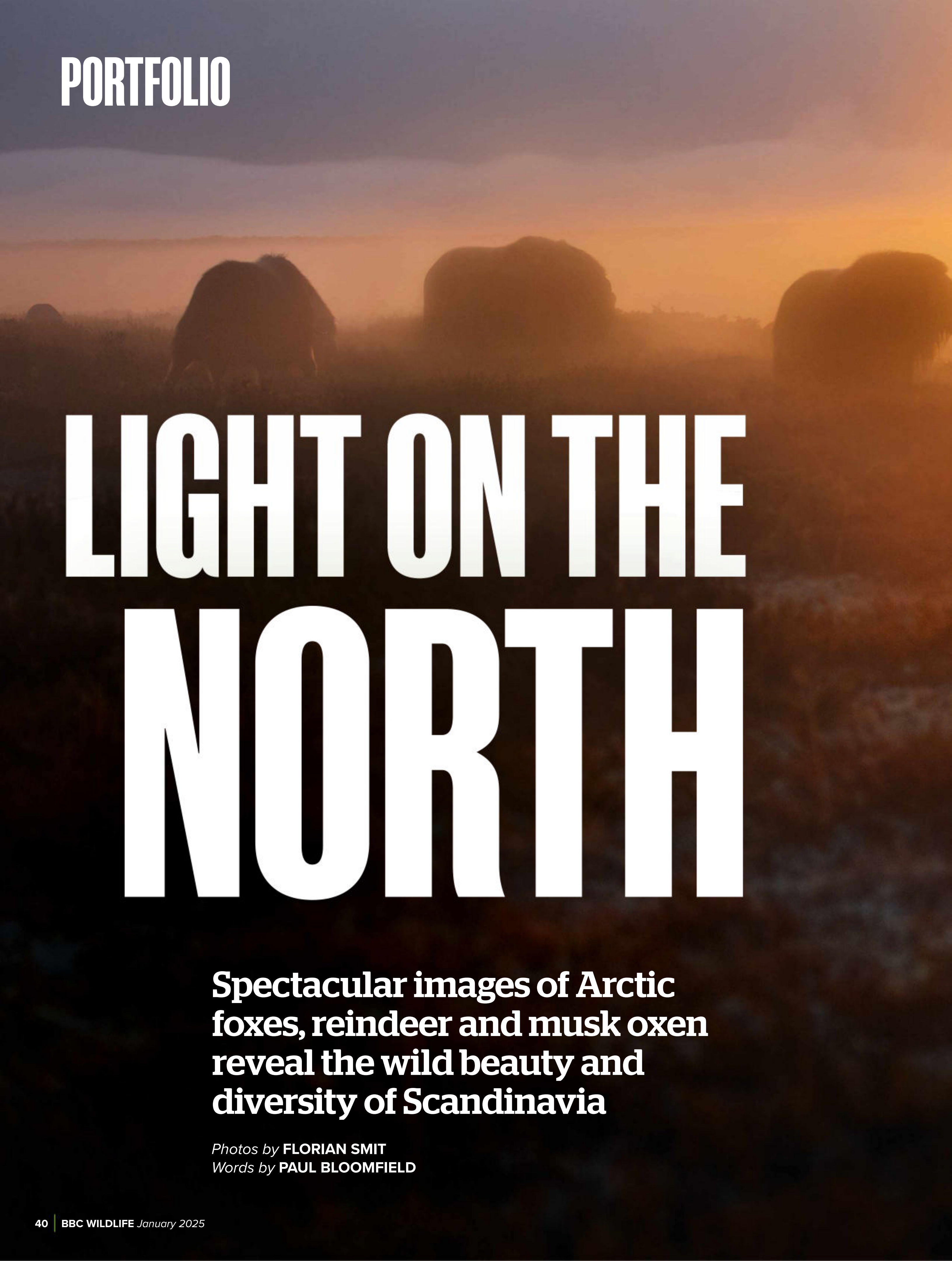


PORTFOLIO

LIGHT ON THE NORTH

Spectacular images of Arctic foxes, reindeer and musk oxen reveal the wild beauty and diversity of Scandinavia

Photos by **FLORIAN SMIT**
Words by **PAUL BLOOMFIELD**

Dawn of prehistory

A golden sunrise glow bathes a herd of eight musk oxen grazing in the mist in Dovrefjell-Sunndalsfjella National Park, south-central Norway. These shaggy herbivores – which, despite the name, are more closely related to goats than cows – lumbered throughout the Arctic tundra of Eurasia and North America during the last ice age. Long extinct in Europe, in the 20th century they were introduced into Dovrefjell. Norway is now home to around 300 musk oxen – one of the key species Florian tracked during his missions to photograph Scandinavian wildlife.

Shaping shorelines

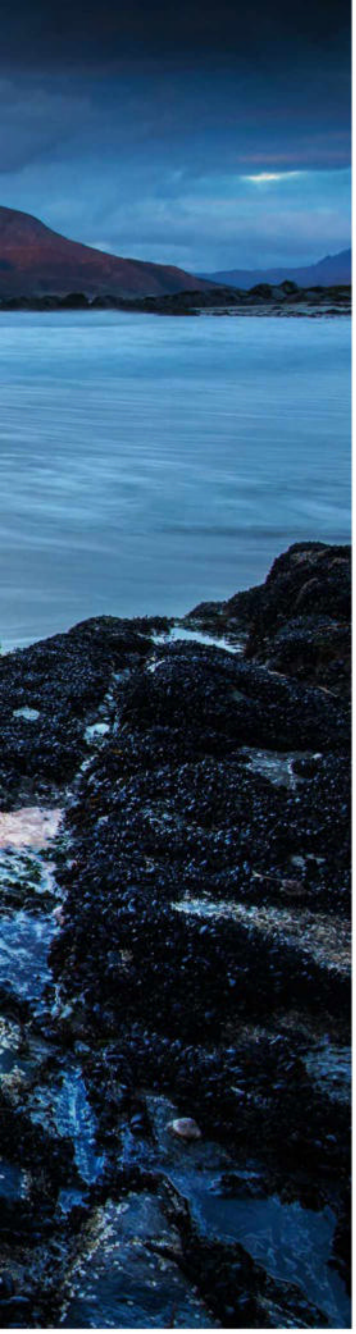
Jagged pinnacles and ridges tear at the Arctic sky above Myrland Beach in the Lofoten Islands, a gnarled talon of an archipelago stretching west from Norway's north coast. Powerful tides between the islands create eddies and whirlpools that surge around coves and inlets, sculpting the craggy shoreline.

Females in focus

Female reindeer are herded together by amorous males during the autumn rut in Forollhogna National Park, south-central Norway. A strong bull wields antlers up to 1.3m long in violent clashes with rival males, aiming to secure mating rights to his own harem, numbering up to 15 cows. Fights can sometimes result in death.

ABOUT THE PHOTOGRAPHER

Florian Smit is a nature photographer and writer based in northern Germany. His latest book, *Skandinavien: Unberührte Wildnis (Scandinavia: Untouched Wilderness)*, with Lisa Marie Smit, is available now. See: floriansmit.com.

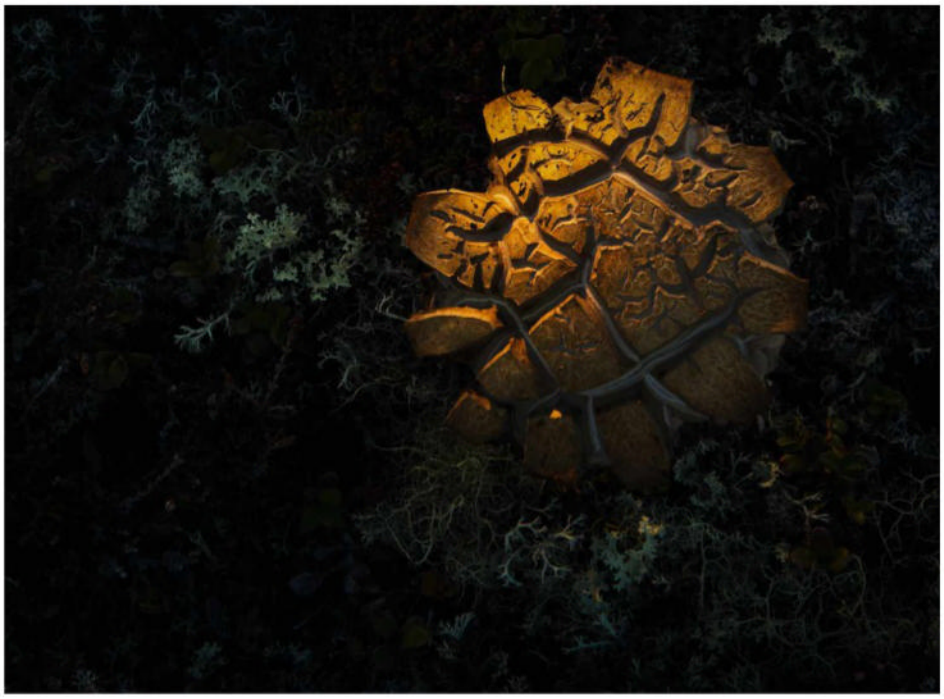


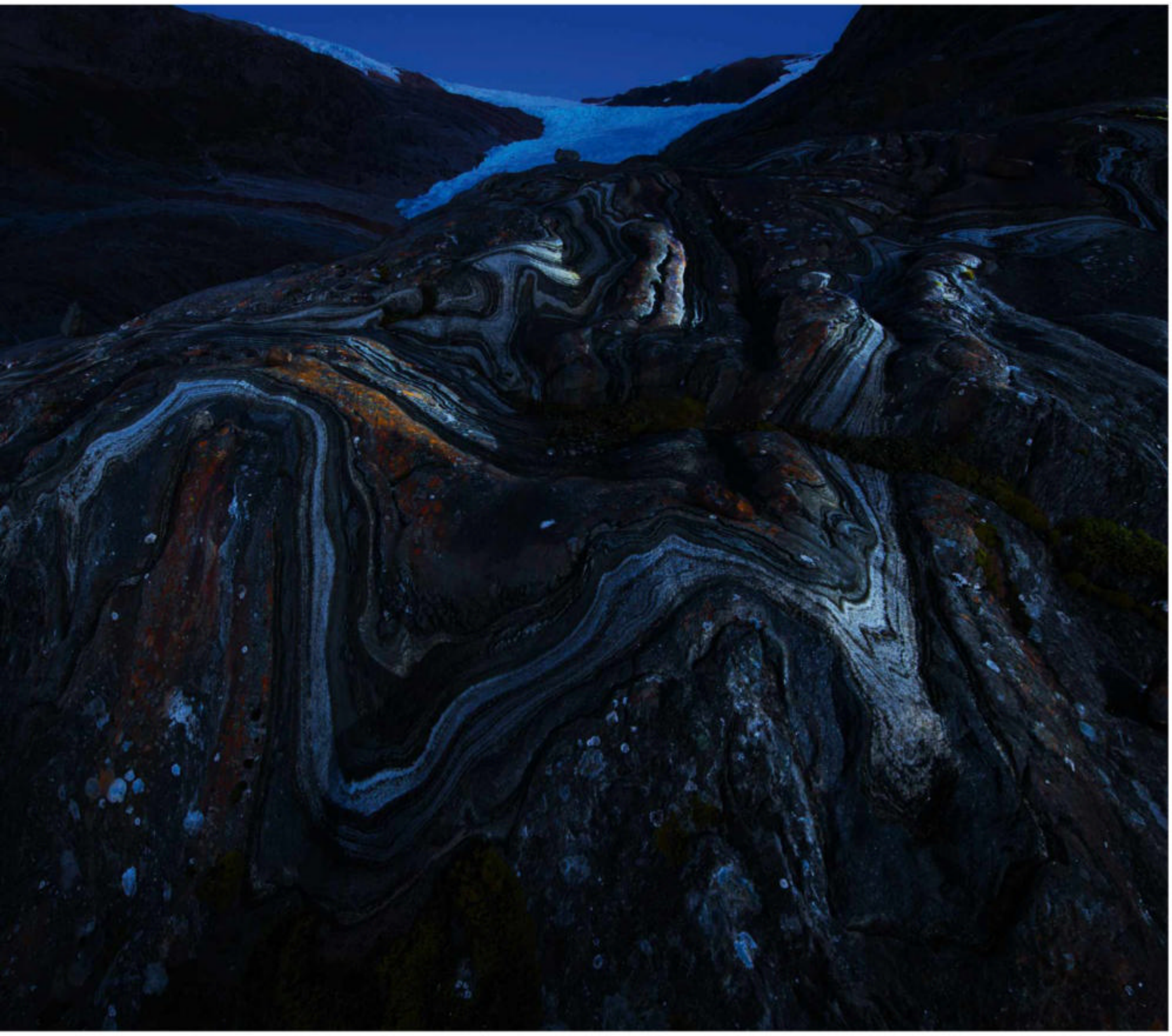
Growing up fast

Eight or nine months after mating, a female reindeer typically gives birth to a single calf in May or June, and the youngster is able to outrun a human within its first day. It needs to be ready to keep up with the herd as it trundles across the landscape, browsing grass, shrubs and lichen. Calves start to eat solid food at the age of about one week, supplementing their mothers' rich milk.

Fractured fungus

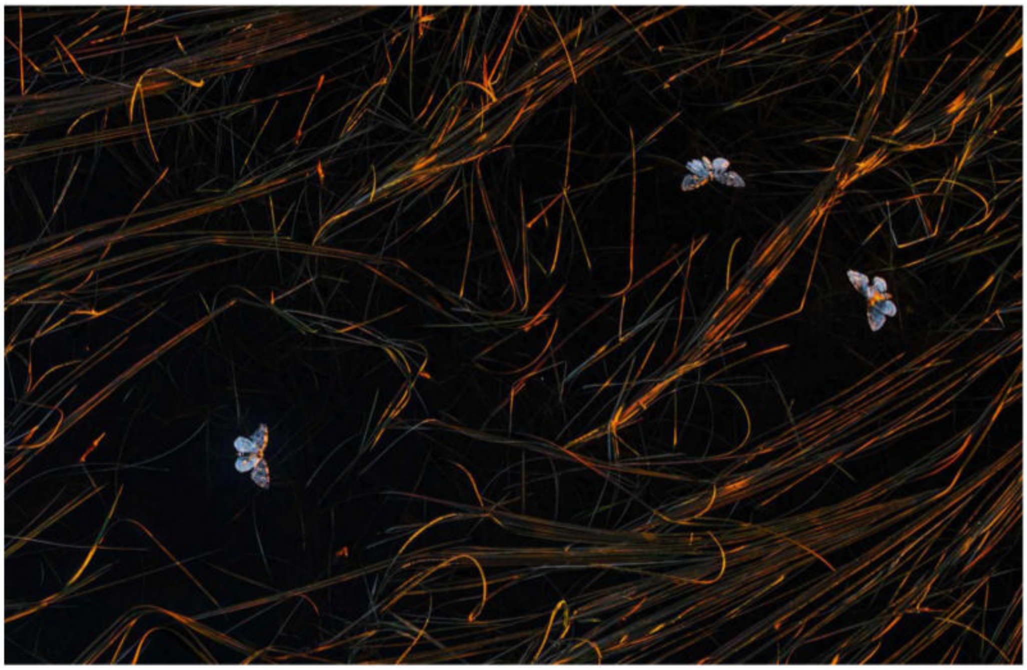
At the tail end of autumn, following a spell of dry weather, mushrooms in Grimsdalen in Norway's Rondane National Park become cracked and misshapen, with fissures on their formerly smooth caps forming fascinating patterns. This relatively arid reserve is an important haven for wild reindeer, which munch on mushrooms in autumn.





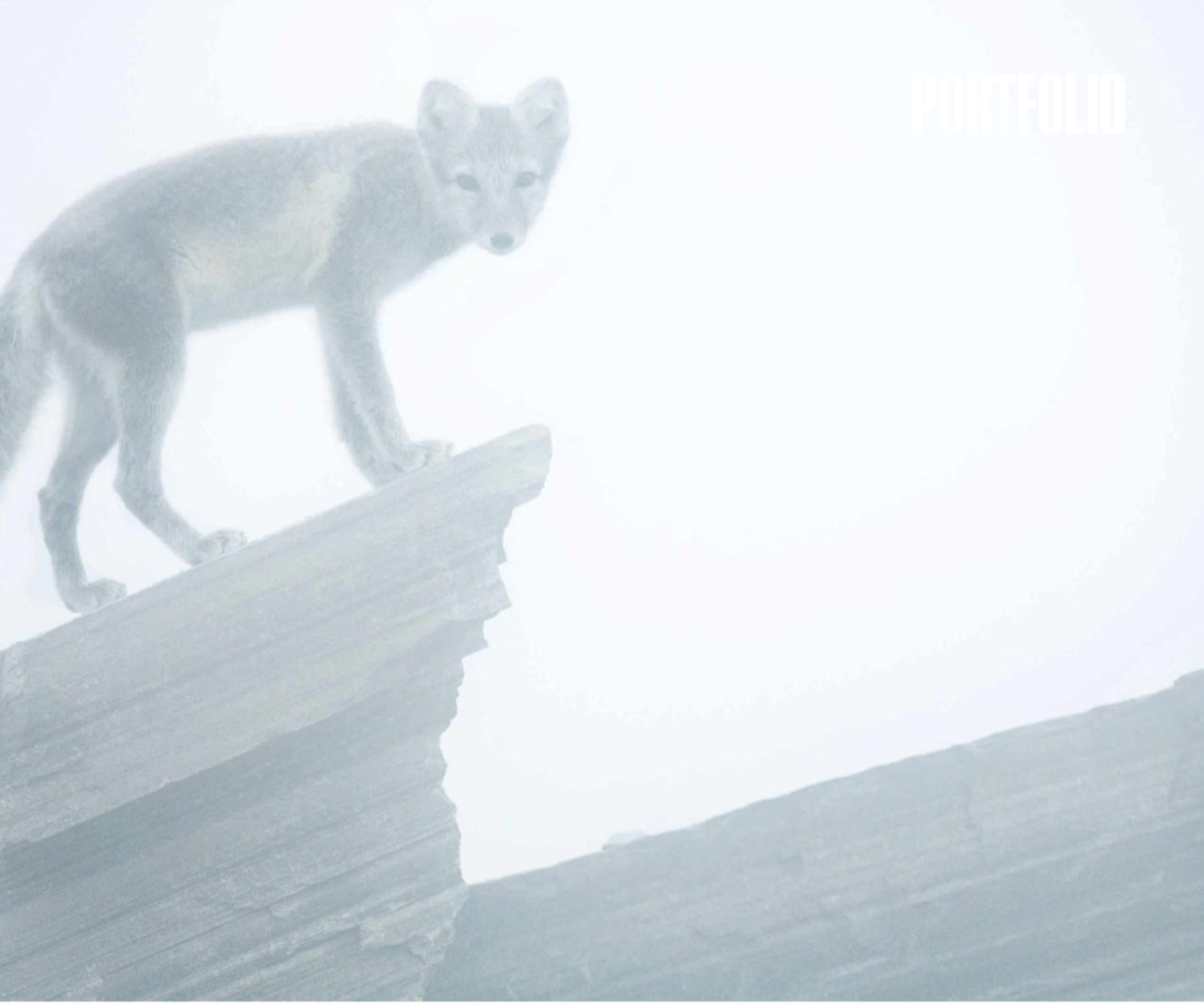
Black beauty

Like a piece of three-dimensional abstract art, varied hues and patterns of bedrock have been revealed over many millennia as the Svartisen ('Black Ice') Glacier ground away strata before retreating among the peaks of north-central Norway.



Frost flowers

These dainty white specks amid ice-rimed grasses and mosses in Muddus National Park, Arctic Sweden, are actually butterflies. As autumn ebbs and winter tightens its grip, these delicate insects succumb to frost, becoming embedded in the vegetation like tiny gems.

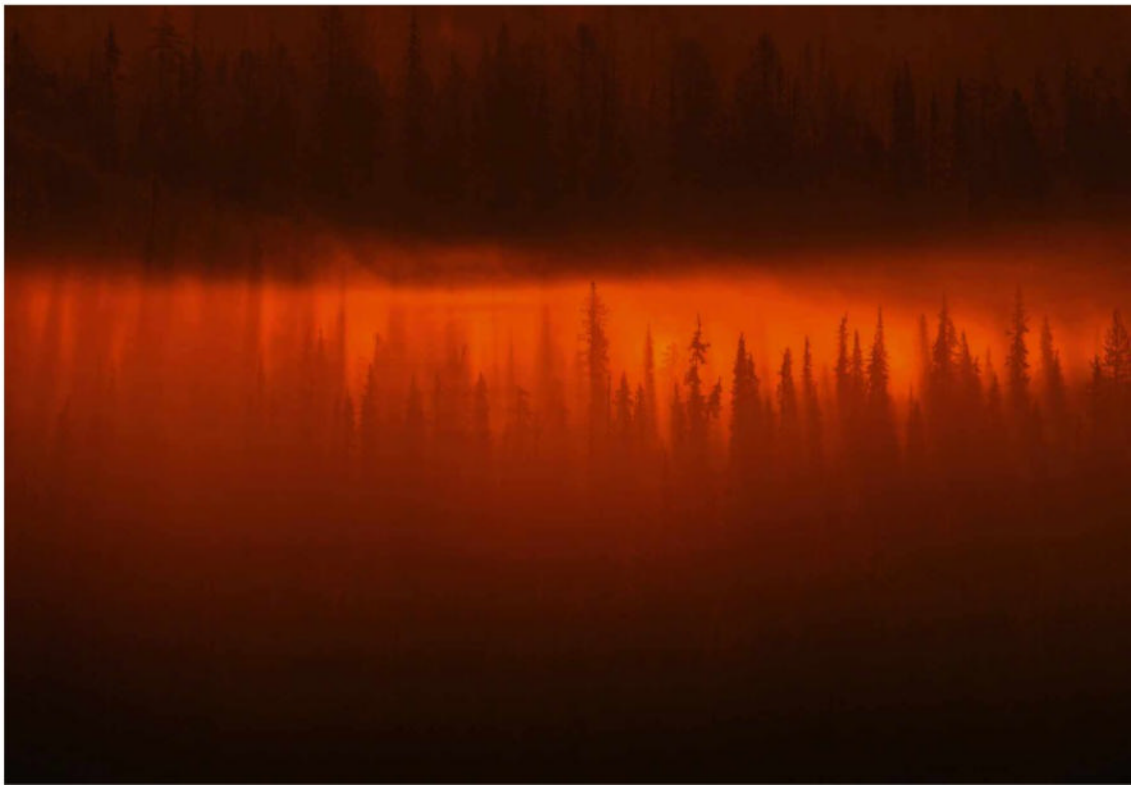


Vision in white

Amber eyes pierce the murk: an Arctic fox, gazing warily at Florian from its rock-top vantage point in south-central Norway. No wonder it's wary: hunted intensively for its fur in the 19th and early 20th centuries, these foxes were driven almost to extinction in Scandinavia, with fewer than 60 adults surviving at the turn of the millennium. Today, thanks to captive breeding and release programmes, that number has soared to an estimated 564.

Can't see the wood

Fog that muffles the trees of Muddus National Park acts as a magical filter at sunrise, the dawn suffusing the forest with an intense orange glow. "The trees rise majestically, like silent sentinels in the distance, trying to reach the sky," recalls Florian's partner, Lisa Marie. "The treetops in the fog are like dreams that elude reality."

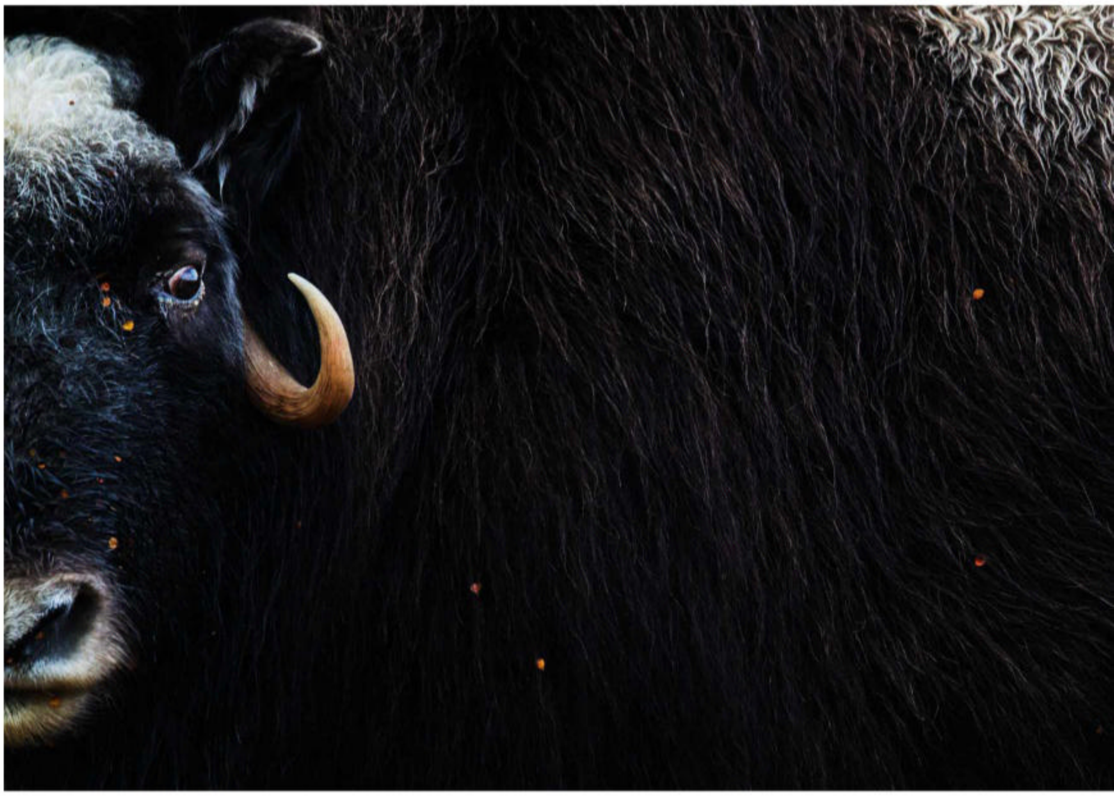


Little and large

Like other species in this challenging environment, musk oxen calves (which are born in late spring or early summer) must be ready to keep up with the herd after just a few hours of life. They need the protection: when threatened by predators, such as wolves, the adults closely encircle the youngsters, facing outwards to create a muscular, horned barricade.

Cape fur

The musk ox's long, shaggy fur, hanging like a cape almost to the ground, is no accident. It's evolved over many millennia to enable this hardy creature to cope with the bitter cold of the Arctic. In fact, it's really two coats: a layer of outer guard hairs over a shorter undercoat that's eight times warmer than sheep's wool and is moulted at the end of each winter.

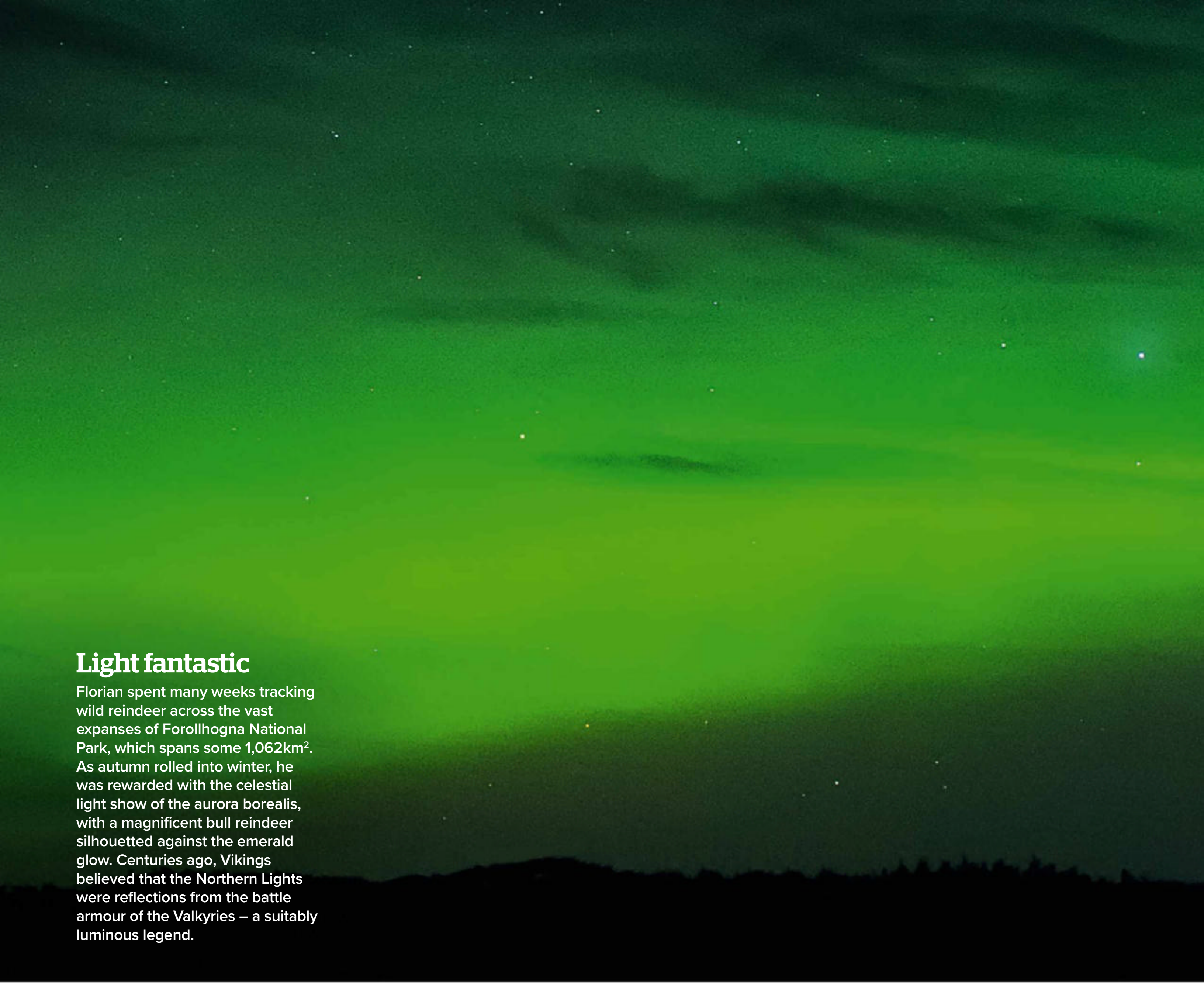


Mysterious island

Trees sprout on the rocky shore of this island off Norway's west coast, dwarfed by the crags on which they're rooted, like bonsai in this otherworldly landscape. The nation's famously long shoreline is speckled with almost 240,000 islands.

Red alert

A flash of rust-red on a snow-strewn branch in Stora Sjöfallet National Park, far north Sweden: a Siberian jay. This corvid, about the size of a mistle thrush, forages for berries, seeds, insects and spiders in the boreal forests of the Arctic, storing tidbits in caches attached to tree bark with sticky saliva. Curiously, both its Latin species name *infaustus* ('unlucky') and German name *Unglückshäher* ('jay of misfortune') reflect its historic reputation for bad luck.



Light fantastic

Florian spent many weeks tracking wild reindeer across the vast expanses of Forollhogna National Park, which spans some 1,062km². As autumn rolled into winter, he was rewarded with the celestial light show of the aurora borealis, with a magnificent bull reindeer silhouetted against the emerald glow. Centuries ago, Vikings believed that the Northern Lights were reflections from the battle armour of the Valkyries – a suitably luminous legend.

Rainbow ridge

The morning sun, refracted through light rain, paints a vast rainbow across the skies of Stora Sjöfallet National Park, striping distant mountainsides. Norway's third-largest protected area, spanning 1,278km², stretches far north of the Arctic Circle and is named for its mighty five-tier cascade – Stora Sjöfallet means 'great waterfall'.

Cold stretch

During winter, Arctic foxes don a white, sometimes bluish coat, providing camouflage among the snow – at least, while there's plenty of white stuff on the ground. As climate change bites and snowfall becomes less reliable, this seasonal pelage may even hamper the fox's ability to hide from enemies and catch prey. For now, this limber creature is a delight to spot in its gleaming habitat.

Harp seal pups epitomise cuteness but the white fur is practical, absorbing sunlight and keeping them warm

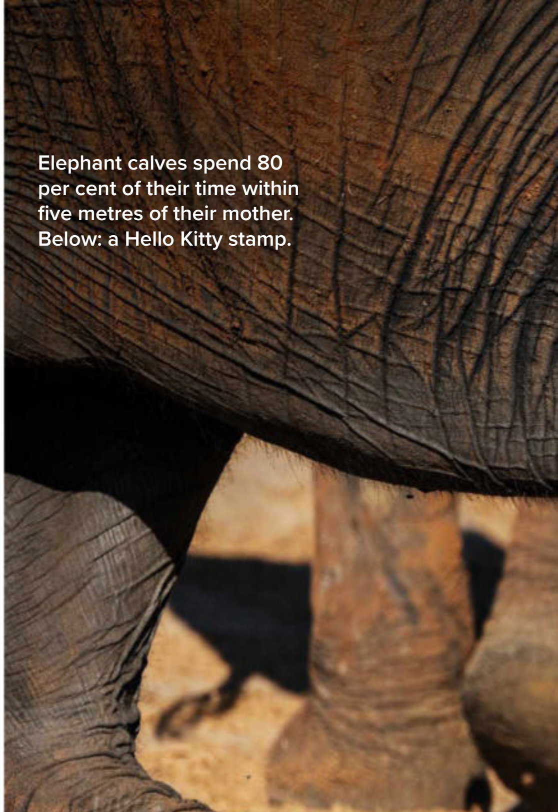
SURVIVAL OF THE CUTEST

We can't help being drawn to cute creatures, but our aesthetic preferences both help and hinder conservation

Words by **JO WIMPENNY**

SEAL PUP: KLEIN & HUBERT/NATUREPL.COM

Pretty as a picture but the rusty-spotted cat is a pint-sized terminator



Elephant calves spend 80 per cent of their time within five metres of their mother. Below: a Hello Kitty stamp.

80
日本郵便
NIPPON

THINK OF THE BBC series *Big Cats* and the rusty-spotted cat might spring to mind, a kitten-sized felid whose prowess for murder did nothing to detract from his ridiculously adorable appearance. The little predator captured hearts worldwide, and a two-minute video of him on YouTube now has more than 62 million views. A quick skim of the 83,000 comments reveals a common theme.

"This is literally the cutest thing I've ever seen in my life," says one. "I want to get this little kitty... sooooo cute," writes another.

His large eyes, round face and petite size are all key traits of what we perceive as cute, and while they're typically associated with baby animals, they needn't be restricted to the natural world. Hello Kitty, Japan's monumentally successful global ambassador of cuteness, is one of the most recognisable characters on the planet. She's also just celebrated her 50th birthday, a testament to the enduring popularity of all things adorable. But what does this have to do with wildlife conservation? Quite a lot, as it turns out.

In his 1990 art installation, *Survival of the Cutest* (*Who Gets on the Ark?*), artist Mark Dion, in collaboration with William Schefferine, crammed a wheelbarrow with cuddly toys, including a panda, orca, polar bear and elephant, as well as other 'charismatic megafauna'. Painted on the wheelbarrow was a list of species and their extinction rates. The message was clear – to be considered worthy of conservation efforts, animals needed to be charismatic or cute.

RUSTY-SPOTTED CAT: TERRY WHITTAKER/NATUREPL.COM; HELLO KITTY STAMP: SERGEY NEZHINKIY/ALAMY; ELEPHANTS: MARTIN HARVEY/NATUREPL.COM

> “We were able to isolate aesthetics as the driving factor for increased willingness to donate”

This bias is well-documented in the conservation world. Charismatic megafauna – typically, large, attractive mammals – dominate conservation priorities, to the frustration of all trying to protect a broader swathe of the animal kingdom. Research confirms it: aesthetically appealing animals such as tigers, elephants and snow leopards receive higher charitable donations, greater advocacy and more public empathy than their ‘unattractive’ counterparts. Some scientists have warned that this could lead to a future where unattractive species are selectively driven to extinction by human aesthetic preferences.

Our rational brains may say that the most endangered species should receive the greatest protection, but in reality we’re more often driven by emotions than logic. And cute creatures spark our emotions in a way that plainer animals can’t hope to achieve. Take the contrasting fates of the giant panda and the Yangtze river dolphin (baiji), for example. Both were large mammals living in China but in 2006, while the public were donating millions of pounds to save the panda, few knew that the baiji had quietly slipped out of existence. Human activity was to blame, but in a 2009 interview with *The Guardian*, naturalist and presenter Chris Packham pulled no punches when he said that the baiji also vanished “because it was pig-ugly”. If it had been beautiful, he said, “I doubt very much that it would be extinct.”

IN MANY WAYS, IT’S NOT OUR FAULT AS we are biologically predisposed to favour aesthetics. Extensive research finds that we attribute more positive character traits to attractive people (known as the beauty-is-good stereotype), and the same is true for animals. Cuteness throws something even more compelling into the mix, because cute things remind us of our own babies. Austrian ethologist Konrad Lorenz introduced a concept known as ‘baby schema’ in the 1940s, suggesting that certain physical features – including large heads, big eyes and chubby cheeks – trigger innate feelings of affection and the protective urge to provide care.

ABOUT THE AUTHOR

Jo Wimpenny is a science writer with a research background in animal behaviour. Her latest book *Aesop’s Animals* (Bloomsbury, £16.19) uses the fables to explore cutting-edge science and natural history.

It's no oil painting but the sole is a flatfish looking to be loved

Short on looks, the Yangtze river dolphin

Ugly ducklings

Raising the profile of nature's 'more aesthetically challenged' creatures was the premise for biologist Simon Watt to establish The Ugly Animal Preservation Society in 2012. "The people who care about the elephants were already on my side," he says, "whereas the person who sees the blobfish as their spirit animal didn't have anybody talking to them." Using comedy to highlight the weird, the ugly and the overlooked has allowed Watt to reach new audiences, including schoolchildren. A major aim has been to get people thinking more critically about conservation, so that they engage in a way that isn't purely emotional. "Hooking people into the emotional relationship with nature is necessary and it works for a lot of people. But when the problems are as bad as they are, I think we need to talk multiple languages."

Much research has been conducted since that supports Lorenz's theory. Studies show that seeing an infant face triggers a surge of activity in the orbitofrontal cortex, a brain area associated with rewards, within just 0.13 seconds. Hormones are also released, including dopamine and oxytocin, which promote feelings of affection and attachment. And while it might seem obvious that we feel an urge to provide care, it wasn't until 2009 that the link to baby schema was backed up by robust experimental evidence: when photos of infant faces were modified to be higher or lower on baby schema traits, adults not only judged the higher-ranking faces as the cutest, they also reported the strongest motivation to care for them.

Animal faces elicit the same physiological and psychological responses. Dog and cat faces manipulated for high baby schema are rated as cuter than unedited images, and some studies have found that baby animals are rated as cuter than human infants.

But can these insights be leveraged for conservation? Hello Kitty has stood the test of time for five decades, an achievement that ultimately comes down to extremely effective marketing. For some researchers, biodiversity conservation is missing a trick by not making use of the same tools.

"Marketing gets a lot of stick," says Diogo Veríssimo, a senior researcher at the University of Oxford. "But arguably people are the key thing to get right in conservation." Veríssimo was inspired to merge these interests during his biology degree, when part-time work at the local zoo revealed the lack of evidence-base behind their educational programmes. "There was no data, and there was no science. We were all just hoping for the best, and that struck me as quite strange," he says.

Veríssimo is on a mission to reframe what marketing means in the context of conservation, arguing that its tools and theory offer untapped potential to drive effective, conservation-related behaviour change. His work has explored the role of species charisma in conservation initiatives, and he has recommended systematic ways to identify conservation flagships, and investigated how to strategically leverage celebrity endorsements to promote conservation behaviour.

While human choices can be complex and unpredictable, sometimes they're governed by surprisingly simple factors. In an analysis of the EDGE (Evolutionarily Distinct and Globally Endangered) programme's website, Veríssimo and colleagues found that a species' aesthetic appeal, its order of listing, and whether it was an EDGE focal species were the most important predictors of donations. In other words, two of the key factors were how the species was marketed, rather than an aspect of its biology.

Adjusting the marketing could lead to huge differences in public donations. The researchers estimated that by simply moving an unappealing species to the first page, for example, the number of donors could be increased up to 26 times. Similarly, in a study (by a different team) of more than 10,000 people adopting animals at the Paris Zoological Park, charisma and alphabetical order of listing predicted the number of

LEMON SOLE: ALEX MUSTARD/NATUREPL.COM; YANGTZE RIVER DOLPHIN: MARK CARWARDINE/NATUREPL.COM; EMPEROR PENGUINS AND LIONESS WITH CUBS: KLEIN & HUBERT/NATUREPL.COM

Emperor penguin chicks huddle for warmth and protection

An African lioness with her cubs in the Kenyan savannah

This giant panda cub in Sichuan, China, ticks all the cute-and-cuddly boxes

adoptions more than conservation status. Aramis, a jaguar listed at the top, received 1,479 adoptions, while Zyko, an arapaima listed at the bottom, received just 26.

In a recent study, Veríssimo analysed the impact of cuteness on donations. Volunteers were asked to allocate hypothetical money to photographs of endangered species – the numbat, kākāpō, purple frog, Indian pangolin and aye-aye – before and after the images had been digitally 'cutified'. Compared with the originals, the cuter versions all had bigger and more forward-facing eyes and, depending on the species, were also brighter, more smoothly furred or declawed (or de-fingered in the case of the aye-aye).

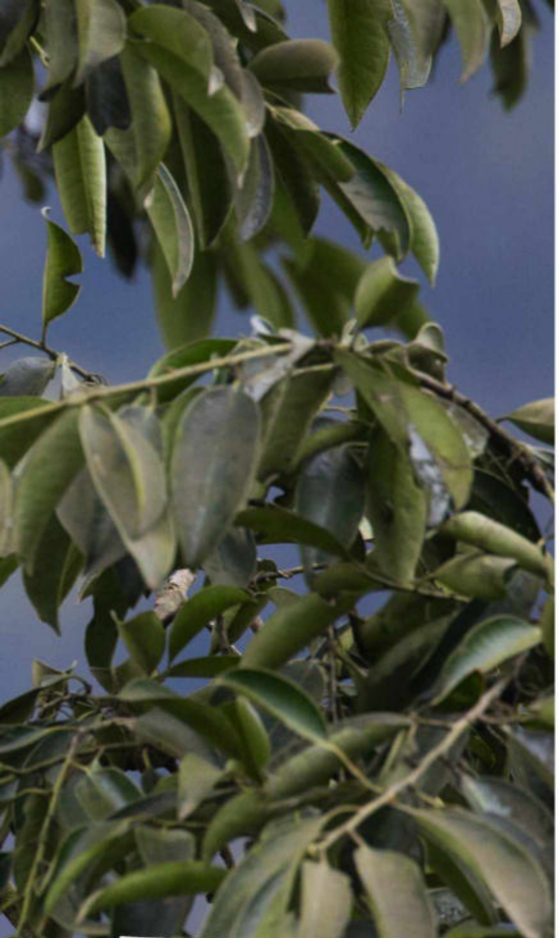
The edited versions were confirmed to be cuter by participants, and also received higher donations. "We were able to isolate aesthetics as the driving factor for increased willingness to donate," Veríssimo says. "That's not saying it's the only factor," he adds, "but we showed that the effect is real." Veríssimo used the results to argue that mammals and birds are prioritised in conservation because of a beauty, rather than a taxonomic, bias.

> "The giant panda is a classic example of a conservation flagship, a species that acts as an ambassador"

Conservation NGOs are no strangers to marketing, but is cuteness an important consideration when it comes to their choice of campaign animal? "Cuteness is important," says Holly McKinlay, director of strategic communications and brand at the World Wildlife Fund for Nature (WWF). "People respond to it because they can see a vulnerability in other animals, and they relate to that." Nonetheless, she emphasises that, as a science-based organisation, WWF imagery is more about depicting the true nature of the animal, rather than it looking cute.

When it comes to WWF's research, McKinlay says they don't look at attractiveness or cuteness, because these are concepts that can be defined in different ways and, as she reminds me, "beauty is

PANDA: SUZI ESZTERHAS/MINDEN/NATUREPL.COM; BALLOON: GETTY; TALAUD BEAR CUSCUS: JOEL SARTORE/NATUREPL.COM (CAPTIVE)



WWF's giant panda logo has been a worldwide marketing success story

PENNANT'S RED COLOBUS: CYRIL RUOSO/NATUREPL.COM; TAMARAW: DANIEL HEUCLIN/NATUREPL.COM; AFRICAN WILD ASS: ERIC BACCEGA/NATUREPL.COM; PYGMY RACCOON: KEVIN SCHAFER/NATUREPL.COM

in the eye of the beholder." She says that recent campaigns with pangolins and walruses, neither of which are traditionally thought of as attractive animals, have been some of their most successful, "because they highlighted something out of the ordinary. It comes back to vulnerability. Cuteness aside, successful imagery involves a vulnerable species and a story to tell."

The giant panda, WWF's iconic symbol, was launched in 1961 by Sir Peter Scott, based on Gerald Watterson's sketches of Chi-Chi the giant panda at London Zoo. While it is clearly a very cute animal, McKinlay says that initial motivations to use the panda were as much about practicality as aesthetics: "Not only is it stunning in its simplicity, but it's a monotone image that is easy to reproduce." It now ranks as one of the most powerful and recognisable symbols on the planet.

The giant panda is also a classic example of a conservation 'flagship', a species that acts as an ambassador for a specific marketing campaign, habitat or conservation issue. Flagships successfully attract funding, but critics argue that the approach only benefits a handful of well-known species.

In a 2012 study, Veríssimo and colleagues analysed the mammalian flagships used by 59 international NGOs on their websites. They found that only 80 species were used out of a possible 1,098, with 58 per cent being primates or carnivores, most frequently tigers.

The study also identified 183 other threatened mammals, dubbed 'Cinderella species,' that were overlooked as flagships despite their aesthetic appeal. The five highest-scoring Critically Endangered species were the Talaud bear cuscus, the Pennant's red colobus, the tamaraw or Mindoro dwarf buffalo, the African wild ass and the pygmy or Cozumel raccoon (*see box, right*).

Veríssimo is unaware of any campaigns subsequently established around Cinderella species, but while the team at WWF were unfamiliar with the term, they noted that "it could be a potentially interesting way to explore different species to communicate on and raise support for."

OUR APPETITE FOR cuteness shows no signs of waning – this is clear from the remarkable longevity of Hello Kitty and the viral response to that little rusty-spotted cat. And yet, while it may seem like a frivolous topic for scientific research, understanding and harnessing the cute response may benefit wildlife conservation.

By strategically focusing on aesthetic qualities, conservationists may be able to draw attention to less familiar or less preferred species, reducing the considerable inequality in how the various species are perceived and supported. Marketing tools may provide additional value by tapping into human behaviour.

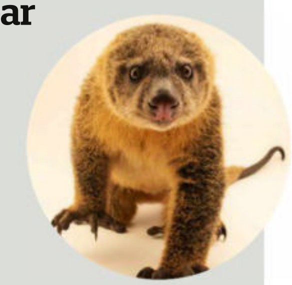
"It's all about how we package it as a narrative," says Veríssimo. "Raising awareness is probably not going to be enough. I think we need to go into the realm of behaviour change if we want to really make a difference."

FIVE TO WATCH

New faces of conservation

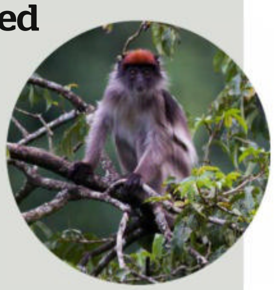
Meet the Cinderella species with the potential to be future flagships

Talaud bear cuscus



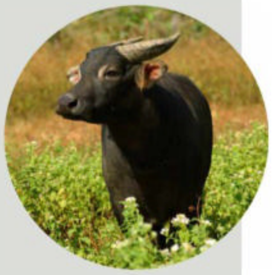
Endemic to a few Talaud Islands in Indonesia, this secretive marsupial faces threats of habitat loss and hunting

Pennant's red colobus



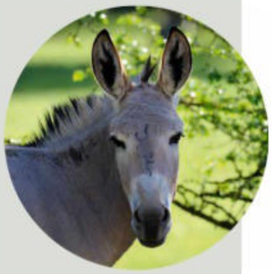
Found only on Bioko Island in Equatorial Guinea, this tree-dwelling monkey has four long fingers and a powerful grip

Tamaraw



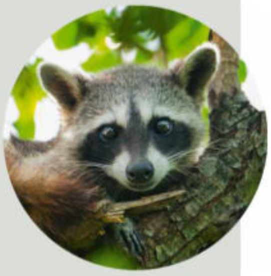
Also called the Mindoro dwarf buffalo, this diminutive animal, with its distinctive V-shaped horns, is found only on the island of Mindoro in the Philippines

African wild ass



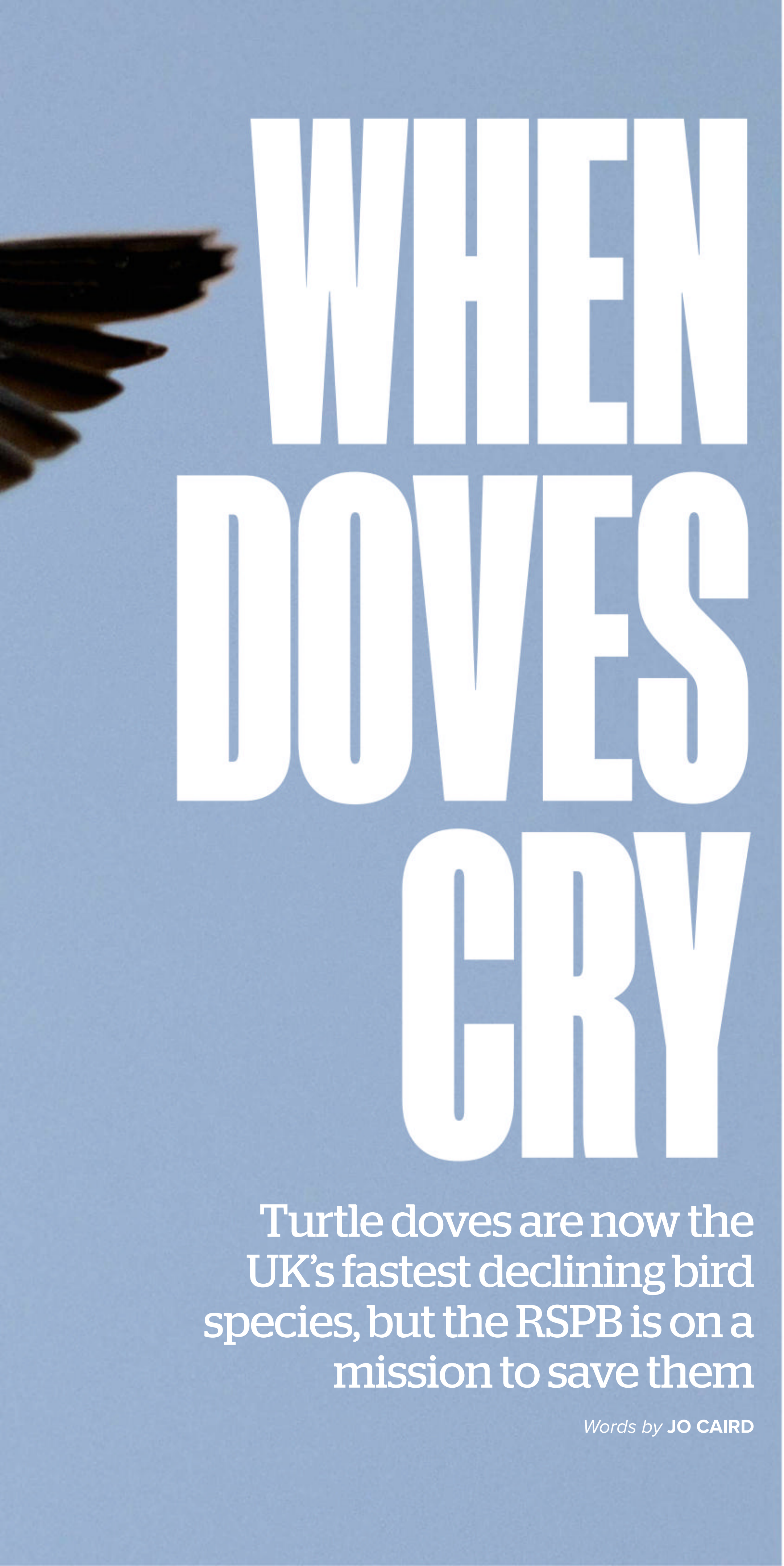
This ancestor of the donkey lives in arid regions around the horn of Africa. A keen sense of hearing is enabled by those huge ears.

Pygmy or Cozumel raccoon



The smallest raccoon species is endemic to Cozumel Island off Mexico's Yucatan

Turtle doves are vigorously territorial and engage in display fights at the slightest sign of another bird



WHEN DOVES CRY

Turtle doves are now the UK's fastest declining bird species, but the RSPB is on a mission to save them

Words by **JO CAIRD**

Mark Nowers, turtle dove conservation advisor at the RSPB, always tells his volunteers not to go surveying in the rain. That's because if you want to track down these shy, expertly camouflaged birds, you need to listen out for the male's purring song – and they don't sing in wet weather.

Yet here we are, strolling through the drizzle at Wrabness Nature Reserve, run by the Essex Wildlife Trust, hoping that a turtle dove will turn up, against the odds, and justify my blurry-eyed 6am train journey from London.

I'm here to learn about Operation Turtle Dove, the RSPB's project (together with Natural England and the Pensthorpe Conservation Trust) to save this iconic farmland species from the dual threats of habitat loss and hunting. The turtle dove is the UK's fastest declining bird species, with a population estimated at just 2,100 pairs following the 2021 National Turtle Dove Survey, down by an estimated 99 per cent since the 1970s.

Mark is just telling me that Essex is home to around 300 pairs, some 14 per cent of the national population, and that Wrabness is a core site for the species, when suddenly he stops, a huge smile on his face. He's heard a dove calling.

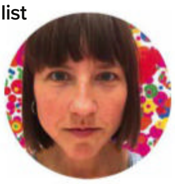
"Tingle down my neck," he whispers, delighted. I hear it too, a gentle cooing that feels somehow familiar despite the fact that I know for certain I'm hearing it for the first time. We listen for a moment before Mark jubilantly declares that it's actually two doves we can hear.

"The males do the singing," he explains, excitedly. "They're staking a claim. They're saying, 'I'm here, ladies, come and get me. Come and nest in this fine habitat I found for you."

These competing birds, who we eventually spot perched in the branches of some trees standing tall above the dense, thorny scrub that covers most of Wrabness's 27ha, will have arrived in the UK in late April or May. To get here, they'll have flown 5,000km from their

TURTLE DOVES: DAVID TIPLING/NATUREPL.COM

ABOUT THE AUTHOR



Jo Caird is a freelance journalist based in London. She specialises in writing about conservation, wildlife and citizen science. You can read more of her work at jocaird.com.

Nests are flimsy but built in scrub or hedgerows to provide shelter for young

Chestnut checkerboard patterns cover the wings and black-and-white stripes mark the neck

FEMALE FEEDING CHICKS: MELVIN GREY/NATUREPL.COM; PERCHING TURTLE DOVE: RSPB IMAGES

> “As well as hedgerows, scrub and good quality foraging, they need ponds and ditches to drink from”

wintering grounds in sub-Saharan Africa, mostly by night, in stretches of up to 700km without a stop.

It’s a journey that has become considerably less perilous recently, thanks to the efforts of the RSPB and many other partners here and internationally in lobbying for a moratorium on turtle-dove hunting. Birds that breed in the UK come via Spain, Portugal and France (the western flyway, as opposed to the eastern flyway, the route for turtle doves that breed in central and Eastern Europe), countries where hunting is a popular pastime. Up to 2018, around one million turtle doves were legally hunted each year in Spain, Portugal and France alone. Fortunately, an International Species Action Plan recognised that this was unsustainable and, since 2021, a temporary hunting ban has been in place in all three countries.

SURVEY DATA FROM THE 2023 breeding season has shown that the western flyway population is bouncing back: going from 1.56 million to 1.96 million breeding pairs since the ban came in. This increase, 25 per cent in just two years – following a continuous decline since 2007 – is “really significant” says Rick Bayne, senior project manager for Operation Turtle Dove.

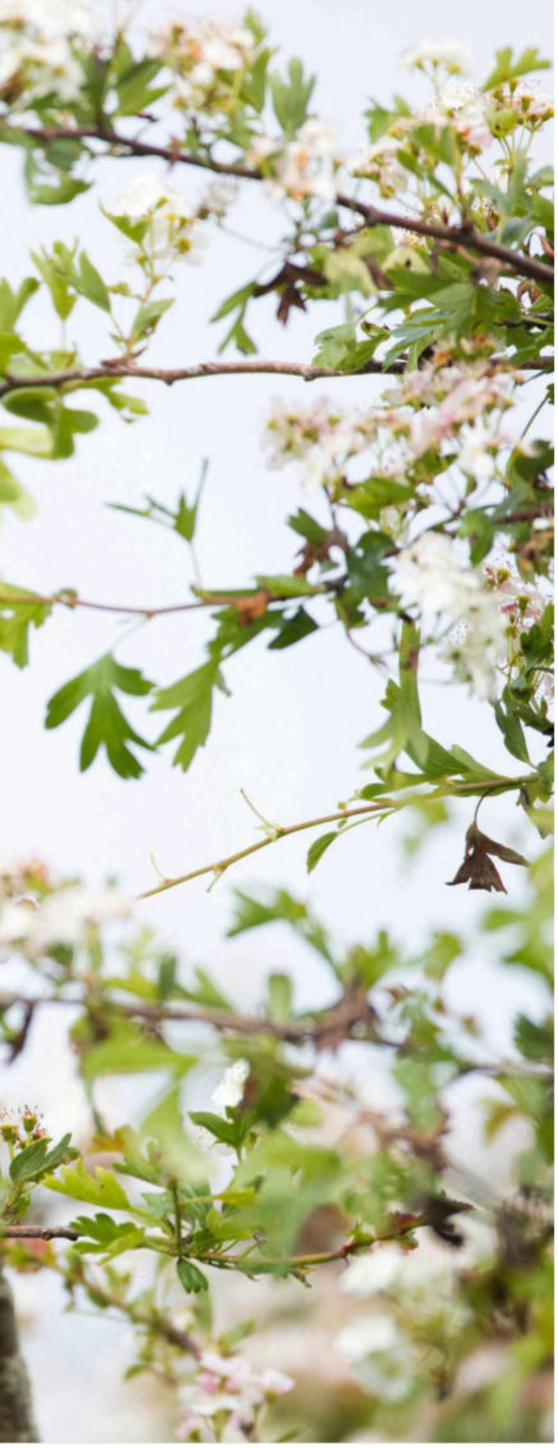
“It certainly suggests that there’s a clear correlation between a hunting moratorium, and a big increase in the core population of the western European flyway.”

If the numbers keep going up, Rick says, this will likely pave the way for future negotiations about the introduction of a system that allows for the hunting of turtle doves but at a level that “the population can withstand and still increase”.

If you’re wondering why the hunting of turtle doves is not simply banned altogether, Rick explains that this was never on the cards: “The key to the whole process of getting a hunting moratorium in place was getting the buy-in from the hunting organisations, and [we] would never have had the engagement if the expectation was that it would be a full ban in the future. But we really do not anticipate any return to unsustainable levels of hunting.”

It’s good news on the eastern flyway, too, where this year a moratorium is in place in Italy for the first time.

When we might see growth in the UK population is still unknown, says Rick: “The expectation would be that effectively empty territories through Spain, Portugal



The dainty doves reach high speeds and can cover impressive distances

Conservation advisors help land managers provide flower-rich habitat

and France are likely to fill up first and then gradually, as birds move further north, that's when we might start to see the increase here. But UK numbers are so low at the moment, that would be a very slow increase."

In the meantime – and even more critical, according to the turtle dove action plan – is improving breeding habitat. The dense thorny scrub and hedgerows where turtle doves build their flimsy twig nests to keep their chicks safe from predators used to be plentiful in the UK, but are in short supply today owing to changes in how we farm. The same is true for the seeds the doves forage on, which come from low-growing plants on open ground, such as chickweed, fumitory, clovers and trefoils.

There's simply not enough good quality forage for them these days, particularly when the birds first arrive back in the UK. As a result, the productivity of the species – the number of chicks successfully fledged per pair – has fallen over time, contributing to the doves' population decline.

Mark's job, and that of his Operation Turtle Dove colleagues elsewhere in eastern and southeastern England, is to improve conditions for the birds, working with farmers and land managers to create more foraging and nesting habitat. As well as hedgerows, scrub and good quality foraging, this includes ponds and ditches – turtle doves need plenty to drink to digest their seed-only diet, and to produce the 'crop milk' with which they feed their hatchlings.

"Farmers are really proud of what they do in terms of their farming, their heritage and wildlife," says Mark. "It's a great privilege to go on to these farms. I say: 'This is what turtle doves need; where do you think this might fit on your land?" Part of his role is guiding them through the complex web of government funding available to support biodiversity on farmland, while also enabling farmers to run their businesses.

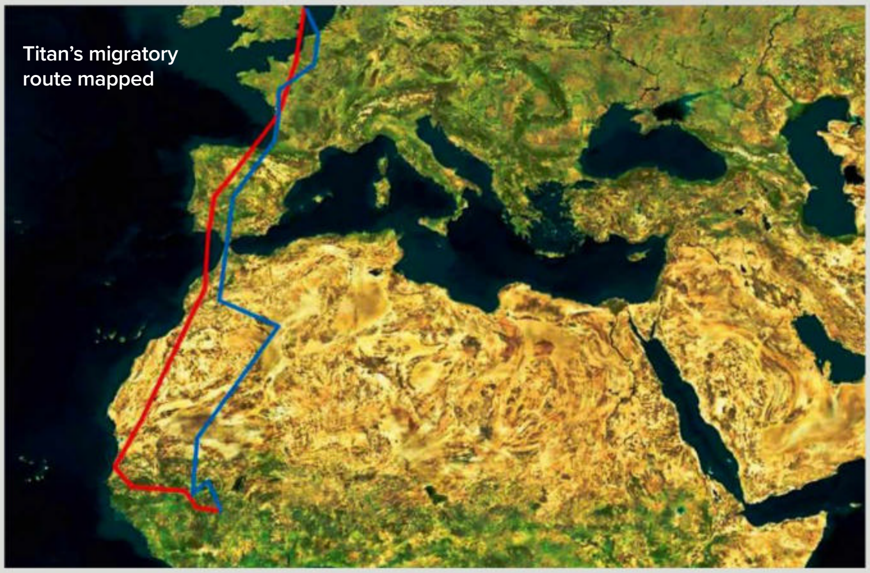
Alongside this work, the RSPB runs a programme of supplementary feeding, where farmers and land managers are given seed mix to put out for turtle doves on a weekly basis throughout the breeding period, right from when they first get back to the UK.

"We want them to get into breeding condition really nice and early, to make sure that they're producing as many young as possible," says Rick. "More bums on nests, and more chicks coming out of nests is our key objective."

FLYING TURTLE DOVE: ROBIN CHITTENDEN/ALAMY; LAND MANAGER: BEN ANDREW/RSPB IMAGES

The name 'turtle' comes from the bird's 'turr-turr' call

Tracking Titan



Titan's migratory route mapped

In 2014, the RSPB Centre of Conservation Science fitted a turtle dove, named Titan, with a lightweight satellite tag in Suffolk before he embarked on his annual migration to wintering grounds in Mali, West Africa (*red route*) and back (*blue route*) – an 11,200km round trip. Titan flew mostly under the cover of darkness, travelling 500-700km per night, at a maximum speed of 60kph. He spent six months in Africa and just four months breeding in England.

A satellite tag is attached to a dove

The supplementary feeding is a temporary fix, designed to fill the gap until there is sufficient good quality foraging habitat for doves in this country, but it serves another purpose, too.

"It provides a really good first step with farmers," Rick goes on. "They are quite comfortable in putting out a bit of seed, so it allows us to engage with them and talk about creating natural foraging and nesting habitat and a water supply."

Ben Whitworth of Dairy House Farm, just down the road from Wrabness, has been putting out seed for turtle doves for a few seasons now, having been made aware of their plight by a farmer friend already working with Mark.

The farmer has noticed an anecdotal increase in the number of turtle doves on his land. "Last year, every day, if you stopped and turned the tractor off and listened, you could hear them," he recalls. Like many of the other farmers that Mark works with, Ben regularly gets in touch with news of turtle dove sightings, often accompanied by grainy pictures shot through binoculars. It's an aspect of the job that Mark clearly relishes: "I love getting bad photos," he says with glee.

While Operation Turtle Dove tackles the long-term issues behind the decline in turtle dove numbers, other projects are seeking more immediate fixes.

> "There have been releases on the Sandringham Estate – even King Charles is a fan of the humble dove"

"I'd like to see them here in my lifetime and not have to wait for my grandchildren to see them come back," says Trevor Lay of the Turtle Dove Trust. The aviculturist and his wife, Deborah, oversee an innovative captive-breeding programme in which Java doves act as foster parents for turtle dove eggs and chicks laid by the trust's resident population of around 100 breeding pairs. Spared the exertion of migration, Trevor explains, the captive turtle doves come into breeding condition earlier than their wild peers, so lay more eggs each breeding season.

The trust releases around 500 turtle doves each year at sites across Lincolnshire, Suffolk and Norfolk, where supplementary feeding continues throughout the summer just as it does with Operation Turtle Dove. Release sites include Watatunga Wildlife Reserve, outside King's Lynn, a park specialising in endangered deer, antelope and birds. For founder (and farmer), Ed Pope, releasing captive Turtle Dove Trust birds on his land is one of several conservation tools.

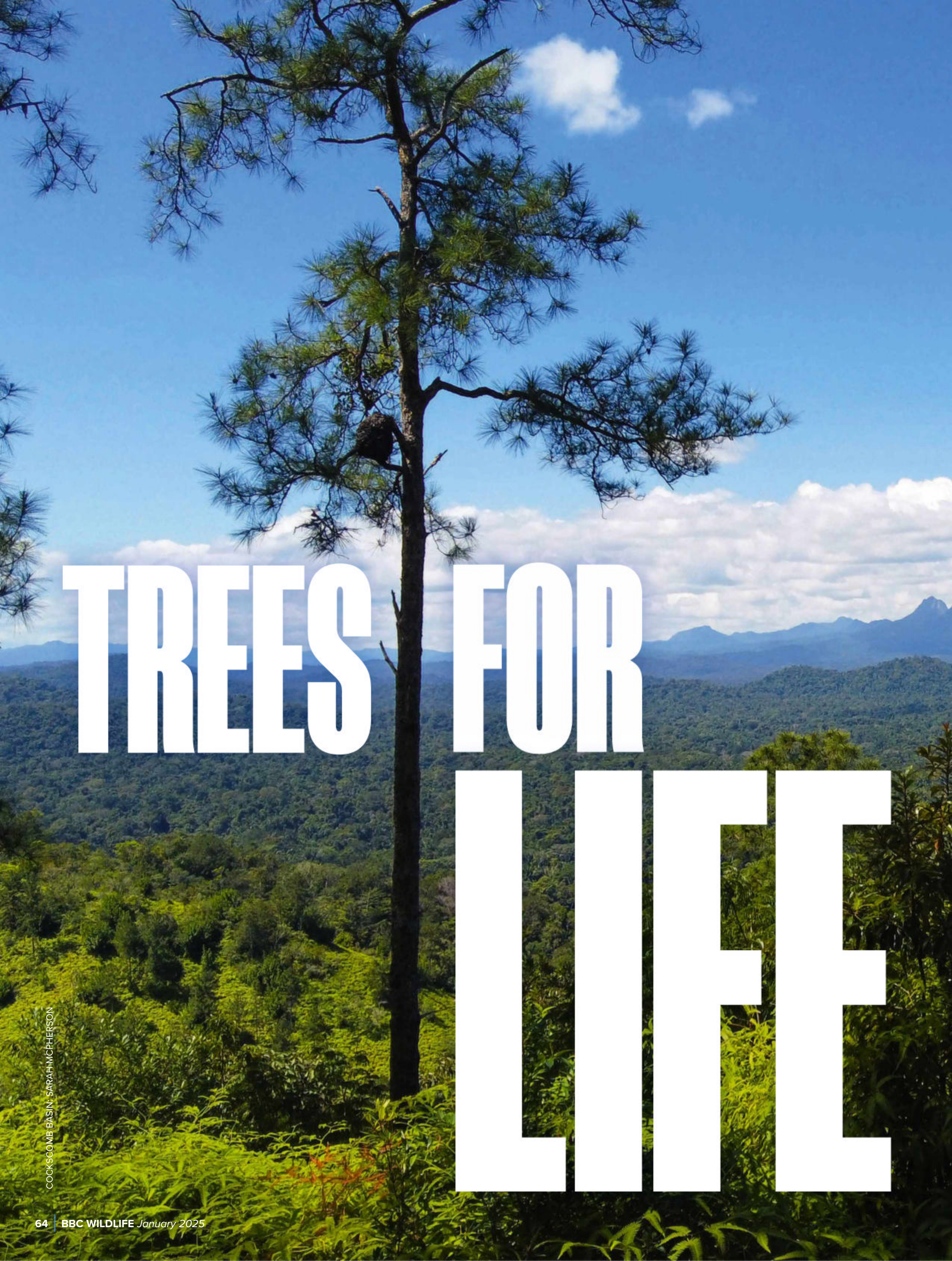
"They don't just spend their time in the reserve but also in the wider farmland, which is set up for seed mixtures and hedgerows," he says. "We talk about endangered species on our tours and the turtle dove is a good example of a native endangered species that we're doing all we can to help."

There have also been releases on the Sandringham Estate – if you check out the estate's Instagram page, you'll see that even King Charles is a fan of the humble dove.

Royal patronage notwithstanding, turtle doves are still in a fix. It's going to take years to see the species recover. But with the success of the hunting ban and the habitat work underway across its British range, the seeds of hope have been sown.

For Mark, "the conversation is changing from the handwringing, 'Oh, we're doomed', sort of thing to, 'This is working'". We're on the way back to the car park at Wrabness when we hear another dove calling, before it takes to the air for a display-flight right over our heads. Mark couldn't be more delighted: "That's mega!"

PERCHING TURTLE DOVE: LUKE MASSEY/2020VISION/NATUREPL.COM; TAGGED TURTLE DOVE: ANDY HAY/RSPB IMAGES; MAP: RSPB IMAGES



TREES FOR LIFE

COCKSCOMB BASIN: SARAH MCPHERSON

Community is at the heart of conservation in the tropical forests of southern Belize

Words by **SARAH MCPHERSON**

The breathtaking view from Ben's Bluff, an overlook in Cockscomb Basin Wildlife Sanctuary. The distant Cockscomb Range, part of the Maya Mountains, is pinnacled by Victoria Peak, the second highest point in Belize.

Ya'axché rangers Rosendo Coy (*left*) and Gerasimo Coc

IN SOUTHERN BELIZE, IN THE district of Toledo, lies the wonderfully named Maya Golden Landscape. This 275,000ha swathe of forest is as magical as it sounds, connecting mountains to coast and sheltering a vast array of wildlife, from the harpy eagle to all five of Belize's big cats.

Nestled at the very foot of the country, Toledo is an undeveloped and sparsely populated corner of Belize. Tourists, most of which hail from the USA, tend not to venture this far down, heading instead for the white-sand cayes of the country's famous barrier reef. Indeed, gazing down over the landscape from a tiny, eight-seater plane, the view reveals no high-rise developments nor sprawling resorts; just acres of greenery, broken up by clusters of dwellings, the occasional shrimp farm and one main road.

The Maya Golden Landscape comprises an impressive nine protected areas that sit virtually back to back. One of these, the Golden Stream Corridor Preserve, is where I'm to spend my first two days in Belize, in the capable hands of local organisation Ya'axché Conservation Trust. In collaboration with international

The gaudy gartered trogon (here a female) is a common bird across Central America

charity Fauna & Flora, Ya'axché has been safeguarding this parcel of land since 1998, not only for wildlife, but for people: Toledo is home to the majority of Belize's indigenous Maya communities, whose rural lives are intrinsically linked to the forest.

Soon after that little plane touches down, I'm exploring Golden Stream for myself, accompanied by Estevan Assi, Ya'axché's community outreach and livelihoods director, who showcases how the forest fulfils the needs of local people. The leaves of the cohune palm – a prominent tree in the Belizean landscape – provide thatching material and nuts; meat comes from game such as deer, paca (or gibnut) and armadillo, and there's even an effective wart treatment in the orange sap of the achiote tree.

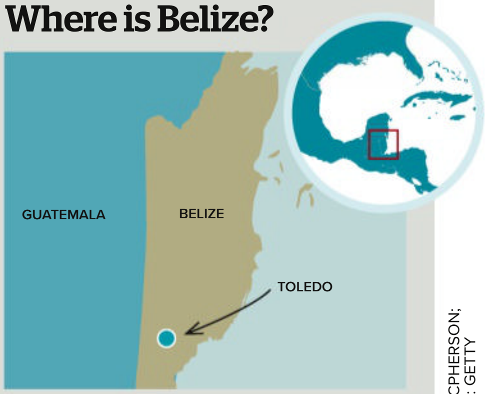
As we walk, Estevan explains how Ya'axché's approach to conservation is to put local people at its heart. Much of its work focusses on seeking a healthy balance between humans and wildlife, for instance using camera-traps to monitor the abundance of game animals and undertaking household surveys to gauge consumption. In turn, the community support is there. "Hunters have an overwhelmingly positive attitude," says Estevan. "Nearly 85 per cent agreed that they must take responsibility not to overhunt; 90 per cent reported concerns that supplies of game could run out."

Ya'axché appears to have had local buy-in from the start, helped to a degree by its

ABOUT THE AUTHOR

Sarah McPherson is managing editor of *BBC Wildlife*. She visited Belize courtesy of the Belize Tourist Board.

Where is Belize?



Belize (known as British Honduras prior to independence in 1981) is located on the eastern coast of Central America. It is the size of Wales, with a population of some 400,000 people.

RANGERS: SARAH MCPHERSON; GARTERED TROGON: GETTY

Many homes in Toledo were destroyed by Hurricane Iris

A trail through Cockscomb Basin Wildlife Sanctuary

choice of name: *Ya'axché* is Mayan for the ceiba (or kapok) tree, a powerful spiritual symbol in Maya culture.

Ya'axché is also working with 150 farmers who still practise traditional slash-and-burn *milpa* farming, to ensure fires are controlled, and has had significant success with promoting sustainable alternatives, such as beekeeping and cacao agroforestry (which combines tree-planting with traditional farming). These concepts work, Estevan explains, "because they are not culturally alien to Maya people." Thanks to its efforts in Golden Stream (for which it won a Whitley Award in 2012), Ya'axché has taken on three other protected areas in the Maya Golden Landscape: Bladen Nature Reserve, Maya Mountain North Forest Reserve and Boden Creek Ecological Preserve.

It was an unexpected and catastrophic weather event that, conversely, helped to shape this new path of conservation in Toledo. In October 2001, Hurricane Iris, a Category Four storm, tore through southern Belize, causing widespread devastation. Then only three years into their stewardship of Golden Stream, the team at Ya'axché found themselves faced with a flattened forest and hundreds of people who had lost homes and crops. Iris had highlighted the fragility of the ecosystem to extreme weather events, underlining the urgent need for sustainable livelihoods and, in turn, climate resilience.

As we follow the sun-dappled trail, twigs crackling underfoot, it's remarkable how the forest and its wildlife have made a comeback. We pause to admire a vast and industrious leafcutter ant nest more than 20m in length; a gumbo-limbo tree, whose peeling red bark gives rise to its alternative name of 'tourist tree'; and the remains of a grey fox, probably a meal for a passing jaguar.

I learn more about forest recovery the next day, when, back in Golden Stream at the crack of dawn, I join science ranger Rosendo Coy, research and monitoring ranger Gerasimo Coc and science director Beth Dorgay on a monthly transect survey. By designating 12 zones within the Maya Golden Landscape that represent different habitats as well as varying gradients of hurricane damage, and surveying for specific indicator birds and mammals, they can record the regeneration in almost real time.

Each transect is one kilometre, with data recorded at 200m intervals. On reaching a tree festooned with a pink ribbon, we stop and listen. A flutey whistle carries on the breeze. "Wood thrush. Two; south and south-east," Gerasimo murmurs, pencilling the data neatly in his notebook. This common North American migrant winters in Belize.

A sharp '*eee'eee*' ripples through the trees – a magnolia, I'm told – and Rosendo identifies the lilting whistle of a yellow-billed cacique and the squawking racket of a gartered trogon, whose striking yellow breast is briefly discernible among the foliage. Their voices are promptly drowned by that of a brown jay, whose brash vocalisation erupts directly above our heads. I quickly see why it's known as the 'police bird'.

We move on to the next marker and I struggle to keep up, ducking under branches

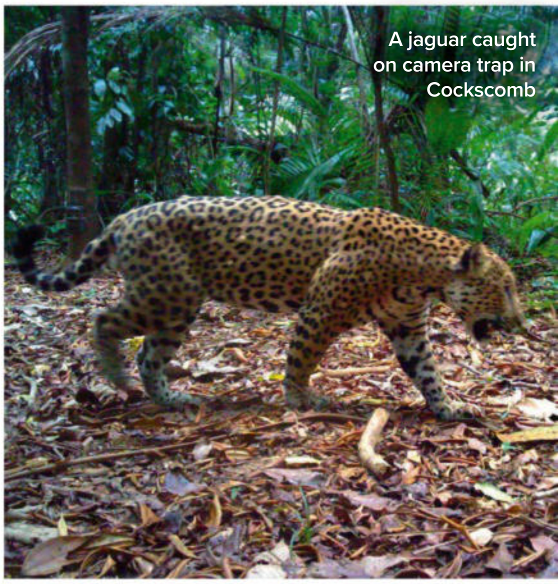
> "Hurricane Iris highlighted the fragility of the ecosystem to extreme weather events"

HURRICANE DAMAGE: FERNANDO MORALES/GETTY; PATH THROUGH COCKSCOMB: ALAMY; JAGUAR: NICK GARBUTT/NATUREPL.COM

The rare and secretive jaguar occurs in 18 countries across South and Central America, from Mexico to Argentina

Traditional chocolate-making, using locally grown cacao, is an ecotourist activity offered by the Maya Center Women's group, among others

The eye-catching seedpods of the achiote tree



A jaguar caught on camera trap in Cockscomb

and negotiating the undulating forest floor. I slip-slide down a steep muddy bank into a channel that, in the wet season, would be a bubbling stream, and narrowly avoid colliding with Gerasimo, who has stopped to point out the perfect imprint of a Baird's tapir hoof. "A big one," he says, impressed.

Tapirs forage along known 'highways', alongside agoutis and pacas, and you can tell which of these smaller forest denizens has been dining by what's left behind. Agoutis are untidy, leaving a chaos of peelings in their wake; pacas are neat, piling their leftovers as if for a kerbside collection. Armadillos also frequent these paths, as do, tantalisingly, those five big cats: puma, jaguar, margay, ocelot and jaguarundi. As we leave the forest, survey complete, I scan the depths in hope, but predictably, no feline eyes stare back.

"Armadillos frequent these paths, as do puma, jaguar, margay, ocelot and jaguarundi"

THE JAGUAR IS SOMETHING OF an emblematic species in Belize. If you really want to at least try for an encounter with this famously secretive cat, there are worse places to start than Cockscomb Basin Wildlife Sanctuary, my next port of call. Located in neighbouring Stann Creek district (but still part of the Maya Golden Landscape), it's named for its distinctive mountains, which resemble a rooster's comb. This impressive sanctuary offers another insight into the significance of local communities to conservation in Belize.

Once logged for hardwoods such as mahogany and rosewood, Cockscomb is today the world's only jaguar preserve, protected for the species in 1984 following the pioneering radio-tagging research of American biologist Alan Rabinowitz (*see box*). As well as its estimated 200 jaguars, this medley of tropical and sub-tropical forest is home to more than 320 species of bird, including rarities such as the crested guan, yellow-headed parrot and ornate hawk eagle, countless plants, amphibians and invertebrates, and some 60 species of mammal. I'm thrilled when, driving into the reserve, a weasel-like creature dashes across the road. It's identified by my guide, Bruno, as a tayra – a feisty little predator native to the Americas.

Stepping into the shady forest, we follow a winding trail to a viewpoint known as Ben's Bluff. Huge, fern-like leaves and twisting vines dangle overhead as the path carves through dense stands of greenery. I feel the cooling spray of a waterfall, admire the sturdy buttress roots of a ceiba tree, and examine the spiny trunk of a give-and-take palm, whose fronds make half-decent brooms. As we near the summit, the forest thins and the path twists sharply, opening

MAYA WOMAN: BELIZE TOURIST BOARD; ACHIOTE TREE: ALAMY; JAGUAR: PANTHERA/BAS/WWF; PLANE WRECK: SARAH MCPHERSON; ALAN RABINOWITZ: STEVE WINTER/PANTHERA

ALAN RABINOWITZ

Cockscomb classroom

In the early 80s, virtually nothing was known about jaguars in Belize. American biologist Alan Rabinowitz was duly hired to carry out a two-year study, funded largely by the New York Zoological Society. Rabinowitz focused his research in Cockscomb, a large tract of government land that had been subject to logging since the 1930s. He managed to radio-collar seven individual jaguars – the first time the species had been collared in tropical forest – devising his trapping methods with little more than trial and error.

Rabinowitz lived among Maya families in an area called Guam Bank, becoming their friend, part-time employer and unofficial doctor. As he describes in his memoir, *Jaguar,* conditions were challenging to say the least. He endured a medley of illnesses, including amoebic dysentery and intestinal hookworm, and nearly lost a finger to one of his captured cats. A plane crash following an aerial survey (the wreckage of which still lies in the sanctuary) left him with a debilitating head injury, and one of his assistants died after being bitten by a fer-de-lance. The biologist also had to bear continued witness to the hunting of the species he was trying to protect. In just 21 months, he documented the illegal killing of 90 jaguars.

Rabinowitz's studies concluded that the Cockscomb Basin contained the highest density of jaguars ever recorded, leading to its designation as a forest reserve in 1984, and a sanctuary in 1986, which allowed for greater protection. Cockscomb has been extended several times, reaching its full gamut of nearly 50,000ha in 1997. This final extension connected the sanctuary with Bladen Nature Reserve in the south, forming a continuous corridor of protected areas totalling about 100,000ha. Rabinowitz went on to co-found Panthera in 2006, spearheading its Jaguar Corridor Initiative, which aims to link habitat across Latin America. He died in 2018 of leukaemia, aged 64.

Rabinowitz using a 'jaguar caller' to entice the cats

PLANE WRECK
Facts

The plane wreckage, still in the forest

into the most jaw-droppingly spectacular panorama of the entire east Cockscomb Basin. A swathe of rolling, thickly forested hills stretches as far as the eye can see, enveloping the limestone hulk of the distant Cockscomb Range. No roads, no pylons, no buildings. Just trees.

Taking in the expanse of greenery, you appreciate just how well connected Toledo's forests are, and why they serve jaguars, which is an incredibly far-ranging species, so effectively. Camera-trap studies by big cat conservation charity Panthera, as part of its long-running jaguar programme, together with the Belize Audubon Society (BAS), have revealed that some individuals travel to the area from as far as 100km away.

COCKSCOMB IS WELL SUPPORTED by the Maya villages on its fringes, such as Maya Center and Maya Mopan, but the journey had bumpy beginnings. The sanctuary's designation came at the expense of several Maya families living within its boundaries, who had relocated from elsewhere in Toledo and established farms, homes and even a church. Suddenly, the forest was off-limits.

"Saying the land was for jaguars and not for people offended everybody," recalls Ernesto Saqui, village council chairman of Maya Center. "The people weren't consulted. Just told 'You get out!' It was difficult."

The BAS saw in Ernesto a means to bridge the gap, and offered him the job of park director in 1987. While his decision to accept alienated the village men, he mustered support from the women when he emphasised that if tourists came to Cockscomb, they could sell crafts at the park entrance. "We needed their husbands to build a gift shop, but they refused," he says. "So the women decreed that there would be no food. Suddenly, we had our gift shop."

The women – who would form the Maya Center Women's Group, which now plays a significant role in Cockscomb's ecotourist product – were tasked with signing in the visitors. Ernesto recalls their first day on the job, dressed in their finery and welcoming tourists. "I saw their eyes sparkling as they sold their stuff," he says. "At that moment, I knew the sanctuary would be successful."

Cockscomb's first wardens also came from Maya Center and Maya Mopan. "Today, 40-50 per cent of our employees are from these communities – they have helped to build the sanctuary to what it is today," says Amanda Acosta, executive director of the BAS. "BAS has supported the Women's Group over the years, and Maya Center has three seats on the local advisory committee."

Empowering Maya women to derive financial benefit from the sanctuary while preserving their culture is what Ernesto is most proud of, as is the altered attitude of the younger generation towards their natural resources. "Years ago, if a child saw a toucan, they'd kill it with a slingshot," he says. "Now, they'll show it to tourists."

With the community at the heart of conservation, southern Belize has the potential to resist the threats of agriculture, development and climate change. Boarding that tiny plane once again, I think of Estevan's parting words: "We still have our forests. And as people, we are not vulnerable as long as we protect them."

The saiga is a rare and particularly distinctive species of antelope

SAIGA: KLAUS NIGGE/NATUREPL.COM

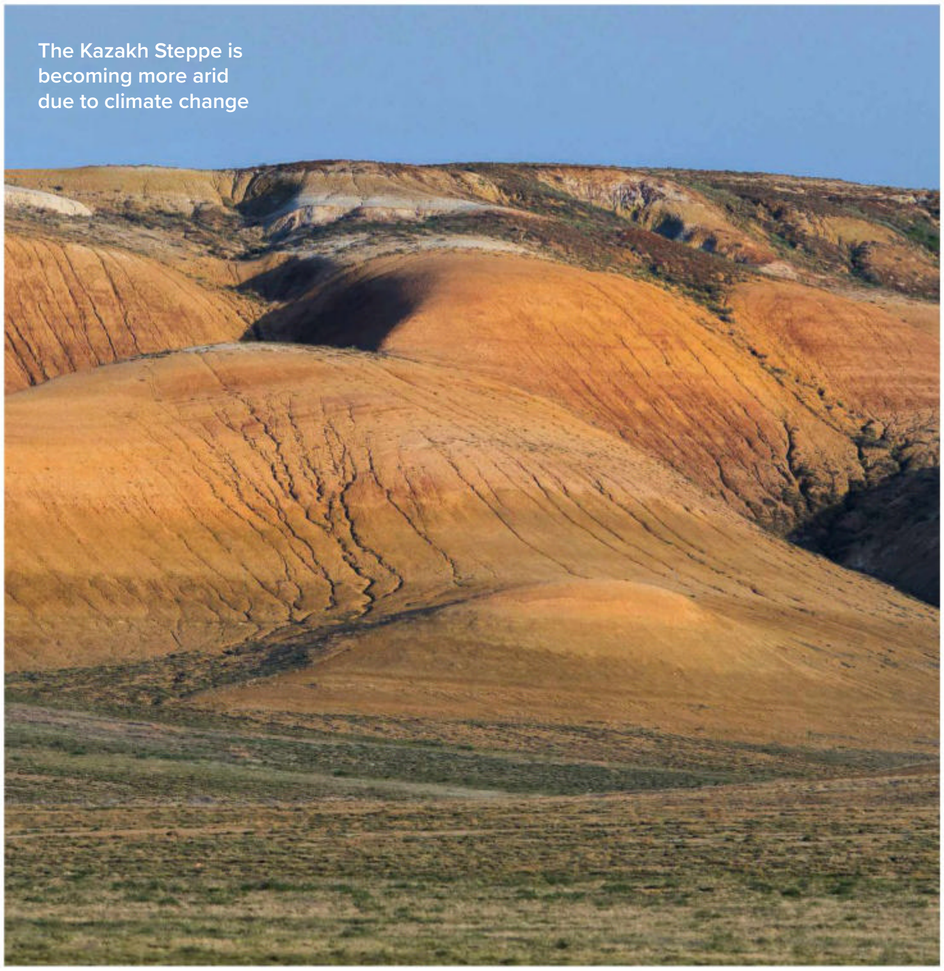
STEPPE CHANGE

Herds of saiga have returned to Kazakhstan, but there's a fine balance to tread

Words by **MARK HILLSDON**

We're following an old Soviet-era map across the Kazakh Steppe when the first saiga break cover. Heads down, they charge through the knee-high grass reaching speeds of up to 120kph, a hard-wired legacy from the days when Asiatic cheetahs were the top predators on these central Asian grasslands.

Vast herds of roaming saiga were once a common sight on the steppes of Central Asia



The Kazakh Steppe is becoming more arid due to climate change

> "A huge herd of saiga several thousand strong spreads out in front of us, grazing in the morning heat"

Following decades of conservation work, this strange-looking antelope, which wouldn't be out of place on the set of *Star Wars*, is back, with more than 2.8 million individuals now roaming the landscape. But 20 years ago, the picture was quite different.

A relic from the last ice age, the saiga once rubbed shoulders with the mammoth and woolly rhinoceros. It is incredibly tough, able to survive the worst extremes the steppe can muster. In winter, when temperatures plummet to -45°C, it grows a thick shaggy coat, while its bulbous nose warms the cold air it breathes. In summer, when the mercury can hit 45°C, its nose helps to filter dust, as well as cooling the blood.

The Kazakh Steppe is a vast wilderness, stretching from the Ural Mountains in the west to Mongolia in the east. Covering more than 800,000km^2, it represents a quarter of the world's remaining temperate grassland. It's a flat, featureless landscape, punctuated by isolated farms and occasional bursts of green, as plants flourish around the scrapes where snowmelt lingers well into summer. The heat of the sun brings out an intoxicating smell of wormwood and other herbaceous plants, while the air buzzes with insects and the familiar trilling of skylarks.

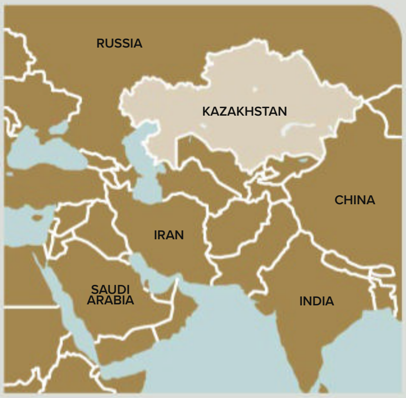
Kazakhstan is the ninth-largest country in the world and a territory of the former Soviet Union. When communism collapsed in the 1990s, so did the country's agrarian

ABOUT THE AUTHOR

Mark Hillsdon is a freelance writer based in Manchester who writes on nature, sustainability and the environment. His work has been published in *The Guardian* and a range of nature-based titles.

SAIGA HERD AND LANDSCAPE: ALBERT SALEMGAREYEV

Where is Kazakhstan?



The Republic of Kazakhstan is a landlocked country primarily in central Asia with a small portion in Europe. It shares borders with Russia and China, with a coastline along the Caspian Sea.

A very thick white coat is grown in winter

economy, with a mass exodus of people from the countryside to the cities. Farms were abandoned, livestock disappeared and the state-sponsored harvesting of saiga for meat also came to an end.

The steppe became lawless, with the saiga at the mercy of poachers who slaughtered the males in huge numbers, their horns much prized for use in traditional medicine in China. This also broke the natural equilibrium, leaving females outnumbering males by as much as 10:1.

Hunting was banned in 1999, but despite the ban being heavily enforced, the population dropped to fewer than 50,000 by 2005. This was the year the Altyn Dala (Golden Steppe) Conservation Initiative was founded, a partnership between the Kazakhstan government, the Association for the Conservation of Biodiversity of Kazakhstan (ACBK), and international groups such as Fauna & Flora, the RSPB and Frankfurt Zoological Society.

By 2015, conservation efforts combined with the hunting ban had seen numbers recover to around 250,000, but when a BBC film crew arrived on the steppe to film that year's calving season for *Planet Earth II*, they discovered a scene of devastation.

The saiga is a species prone to sudden die-offs, and in this case it's thought that the warm, wet spring conditions caused bacteria that usually live benignly in the animals' noses to become toxic, leading to septicaemia and death. That year, nearly 120,000 animals perished. Nonetheless, the saiga is resilient and has developed ways to deal with a naturally oscillating population, such as a tendency to give birth to twins.

Without saiga, large areas of the steppe are left ungrazed, which means the grass grows much taller. This deprives birds, such as the sociable lapwing, of the shorter swards needed for nesting.

They're a keystone species explains Michaela Butorova-McGurk, Kazakh Steppe project manager for the RSPB. "The way

Hunters with their saiga quarry back in the 1950s, when Kazakhstan was part of the Soviet Union and hunting was common

Fitting satellite collars helps conservationists track where saigas migrate and calve

Giving birth to twins is a reproductive insurance strategy

SAIGA PORTRAIT AND FIELDWORK: ALBERT SALEMGAREYEV; HUNTERS: FOTOSOYUZ/GETTY; MOTHER WITH CALVES: WILD WONDERS OF EUROPE/SHPILENOK/NATUREPL.COM

> "In winter its bulbous nose warms the cold air it breathes, and in summer it cools the blood"

that saiga move across the landscape and graze at different times means they create a mosaic habitat," she says, "and by trampling droppings in the earth, they help the cycle of nutrients." Dead individuals also provide food for endangered species, such as the steppe eagle, which is showing promising signs of a comeback.

Saiga also keep vegetation under control says Alyona Koshkina, a scientist at ACBK, consuming up to 70 per cent of steppe biomass and preventing wildfires from getting out of control. Without them, she adds: "something else would have to consume it, and this would be fire".

The Altyn Dala Conservation Initiative has helped to create protected areas across Kazakhstan, covering more than five million hectares, with the most recent the 657,000ha Bokey Orda and Ashiozek Sanctuary in West Kazakhstan, designated in 2022, which includes the key calving and rutting sites of the world's largest saiga population. In November, Altyn Dala won the 'Protect and Restore Nature' category of The Earthshot Prize 2024 (*read more about Earthshot on p15*).

Technology has played a huge role in establishing these areas, explains Albert Salemgareyev, lead specialist at ACBK, whose work saving the saiga was recognised with a Whitley Award in 2023.

Using drones, satellite collars and GPS tracking equipment, Salemgareyev and his team were able to plot migration routes and calving areas, using the data to show the vast areas across which the saiga roam, and providing the evidence needed to create the reserves. He was also able to divert infrastructure projects that could have blocked these historic routes, and, by knowing where the herds are, rangers can stay one step ahead of the poachers.

Ishmukhambetov Yerzhigit is deputy head of the team that patrols the protected areas around the Kaztalovka district, close to the Russian border. The reserve is bordered by small villages and farms, where local farmers depend on the landscape for grazing sheep, cattle and horses, as well as for fresh water.

Driving out to visit some of the farmers, along dirt tracks that throw up huge plumes of dust, Yerzhigit explains that there is a deep sense of pride among many Kazakhs of the way the saiga has been saved. He saw his first saiga five years ago, when he was 19. "I'm not a hunter," he says. "My heart wants to help protect them."

Yerzhigit is in charge of 54 rangers, most of whom are local people who know and love the steppe. As well as anti-poaching patrols, they monitor and record wildlife and play an important role in nurturing relationships with farmers, communicating an understanding of the saiga and the laws that protect it – collecting the horns from dead animals, for instance, is illegal. The rangers also help farmers to steer saiga away from their pastures.

As we crest a hill, a huge herd of saiga several thousand strong spreads out about 100m in front of us, grazing in the morning heat. Yet only a few years ago, Yerzhigit tells me, you would have been lucky to see half a dozen. "It was the empty steppe, there was nothing there," he says. Thanks to its recovery, the saiga has now been reclassified by the IUCN from Critically Endangered to Near Threatened.

It's a huge conservation success, yet tempered by a growing conflict. Saiga are now competing in some areas with livestock for food and water, leading to mounting pressure on the government to control their numbers. "Some farmers are getting angry," says Koshkina from ACBK. "[They] have spent the last 30 years living without saiga – they don't want them back."

I head to the office of Abdreshev Zulpkarovich, head of the department of entrepreneurship and agriculture in Zhanibek, another western Kazakh town. He explains that farmers are worried by the huge increase in saiga numbers. "The main source of living and surviving is cattle… there are so few places to work here," he says.

As well as competition for resources, clashes occur when saiga trample hay

The saiga is a keystone species on the steppe grasslands

Males are most vulnerable due to their prized horns

“Compensation for lost crops, ecosytem payments for farmers and translocations are on the table”

meadows – farmers use the hay to overwinter cattle indoors. The antelope are also blamed for spreading ticks and other diseases. “We are not against the saiga, but we would like to regulate the number,” he says. “It would be better if locals benefited from them.”

Salemgareyev from ACBK concedes that at the start of the programme they were too focussed on conservation, and didn’t give enough thought to the future management of the saiga. Yet he also believes that they are an easy target, when in fact climate change is far more to blame for conflict.

In recent years, he says: “The steppe has turned from green to brown by June, not late summer,” with the heat, as well as shifting rain patterns and later frosts, killing the grass. This is compounded by less winter snow, which means the saiga don’t need to migrate to find food, putting further pressure on the landscape.

THE CURRENT GOVERNMENT HAS recently made it clear that there will be no saiga cull, or a return to harvesting the antelope, so other solutions are needed. Some, such as deterring saiga with scarecrows, dogs and electric fences, will be trialled, with ideas around compensation for lost crops, ecosystem payments for farmers to co-exist with saiga, and translocations also on the table.

Altyn Dala is looking to develop more ecological corridors to connect protected areas so that saiga can use the space in a more sustainable way, says Butorova-McGurk from the RSPB, while Salemgareyev is working with the Kazakh government to petition Russia, as it has already with Uzbekistan, to remove some of the border fences and allow saiga to roam more freely, though this is unlikely to be welcomed by Russian farmers.

ACBK believes the answer could lie in education, and is explaining the benefits that a healthy saiga population can bring to the steppe. It is raising awareness in rural schools with Saiga Clubs, which draw on the myths and legends associated with the saiga, and talking directly to farmers to pinpoint where livestock and saiga overlap. Using drones and camera traps, it is also identifying key conflict hotspots so that solutions can be more targeted, says ACBK’s Koshkina.

Driving across the steppe one final time, we are suddenly engulfed by a herd of saiga, zig-zagging across the grasslands from every direction, hurtling helter-skelter and easily outpacing our four-wheel drive. Conservationists, farmers and politicians will need to continue discussing how to manage this growing population, and the dark spectre of another mass die-off could be just around the corner. But for now, as hundreds of animals thunder past, I take a moment to enjoy this incredible spectacle, a true natural wonder.

SAIGA: ALBERT SALEMGAREYEV; AMUR TIGER: VLADIMIR MEDVEDEV/NATUREPL.COM

REINTRODUCTION

Welcoming tigers back

Kazakhstan is the only country in the world planning to reintroduce tigers. The big cat has been extinct in the country for more than 70 years, but in September 2024, two captive Amur tigers were translocated from a sanctuary in the Netherlands to a special 3ha enclosure in Ile-Balkhash Nature Reserve, south-east Kazakhstan.

Any resulting offspring will be released into the wider reserve, which features a mixture of wetlands and forest, and favoured prey species such as Bukhara deer and Kulan. The tigers’ reintroduction is the first of several planned over the coming years, with the goal of building a population of up to 50 wild tigers by 2035.

Wild Amur tigers are currently found in the Russian Far East

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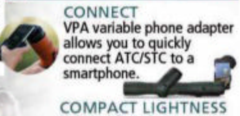

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Optically upgraded to feature HD glass & bigger objective lenses for improved clarity and brightness of the image. Fully waterproof.

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A high-end spotter, without the high-end price tag, the Viper HD Spotting Scope series stands poised to dominate as a best-in-class-optic.

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50mm, 65mm & 80mm SPOTTING SCOPES

Nitrogen Purged - Waterproof - Shockproof

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The new Vortex Crossfire HD spotting scopes offer users a choice of 3 affordable models each featuring a 3x zoom and an HD optical system with select glass elements to aid resolution, light transmission, colour fidelity and cut chromatic abberation.

The helical (barrel) focus allows for quick and easy focussing while the fully multi-coated lenses have anti-reflective coatings on all air-to glass surfaces for increased light transmission bringing greater clarity and low-light performance.

80mm
65mm
50mm

80mm Straight
65mm Angled
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- ***Includes Neoprene Stay on Case***

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NEW HD MODELS

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10x32	£249	**£229**
8x42	£259	**£235**
10x42	£269	**£245**
10x50	£289	**£259**
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HD extra-low dispersion glass. Award winning binoculars.

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10x42	£1112	**£999**
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12x50	£1169	**£1055**

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8x42	£1699	**£1329**
10x42	£1729	**£1359**
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Light and tough.

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Outstanding clarity & wide field of view. For birdwatching or tracking wild animals.

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Super steady view in the most extreme weather conditions.

Protecting Canon's finest quality L-series lenses with a robust, water-proof housing, the 10x42L IS WP binoculars provide unrivalled clarity, and stabilized field scoping performance.

- L-lens quality - the very finest in precision optics
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10x42L IS WP - RRP £1699.99 **£1499.99**

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	RRP	NOW
10x30	£569	See website
12x30	£579	
14x30	£599	
16x42 NEW	£849	

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4K Digital Thermal Binocular

Multi-spectrum binocular!

Introducing the entry level Habrok 4K multi-spectrum binocular which combines the detection power of thermal with a high resolution 4K camera that delivers in daylight, twilight and darkness - all at an impressive new price.

- Quick Scan and Search with Thermal Technology
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NEW
Naked Eye
Through Harbrok 4K

	Lens	Sensor	Mag.	F.O.V	Range		
Habrok 4K HE25L 5.5-22x60	25mm	256x192 12μ	4-32x 8x	12.2m x 9.3m	1200m	£1299.99	**£1199.99**

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SPOTTING SCOPE

88% Light transmission | ComfortVision concept | Duel speed | Two models availble

High performance spotting scope

Elaborate lens system - FL glass and other custom glass ensure an absolutely sharp and colour fidelity image even at maximum magnification.

85
95
ZEISS T* Coating
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Victory Harpia 85 - 22x65 - Body Only	**£3300**
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SPOTTING SCOPE

Short close-focus | 85mm objective lens diameter | 60x magnification

Explorers companion

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ZEISS T* Coating

Conquest Gavia 85 30-60x............**£1850**

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90% Light transmission | Ultralight & compact Design | Perfect Ergonomics | Four models available

Lightweight model among high-performance binoculars.

New Ultra-High-Definition (UHD) concept ensures true-to-life color reproduction and the highest level of detail.

Victory SFL 8x30	460g	**£1300**
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Rediscover the world of birdwatching with the ZEISS Victory® SF.

Experience every spectacle nature has to offer with brilliant optics and an unparalleled wide-angle field of view. Light weight with a unique ergonomic design and dynamic fast-focus feature allows for hours of relaxing birding without fatigue.

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Model	Colours	Price
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Terra ED 10x32	Black, Black/Grey or Green/Black	**£480**
Terra ED 8x42	Black, Black/Grey or Green/Black	**£480**
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Perfect all-rounder - outstanding performance for ambitious nature observation.

Model	Colour	Save	Was	Now
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Conquest HD 10x42	Black	SAVE £275	WAS £1100	**NOW £825**
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Enhance your nature experience - for more discoveries at night and during the day.

Compact & lightweight | High resolution LCOS Display
Precise zoom | Two models available

ZSIP Pro image processing | Romovable battery
High resolution AMOLED Display | Two models availble

Model	Save	Was	Now
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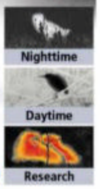
DTI 6/20	SAVE £1750	WAS £4000	**NOW £2250**
DTI 6/40	SAVE £1750	WAS £4250	**NOW £2500**



PULSAR IMAGE QUALITY

NEW

AXION XQ30 PRO

Thermal Imaging Monocular

NEW
PULSAR
STREAM VISION 2
THERMAL TECHNOLOGY

- Compact pocket-sized design
- A selection of 8 color palettes
- 3 Sensitivity amplification levels
- Wide field of view for easy scanning
- Highly sensitive thermal imaging sensor
- Rugged magnesium alloy housing
- Photo and video recording
- Stream Vision 2 app support
- Frost-resistant AMOLED
- DisplayPicture-in-Picture Function
- IPX7 Waterproof rated

For image capture Axion XQ30 Pro uses professional-grade thermal imaging sensor with 384x288 pixels resolution and less the 25mK thermal sensitivity. This ensures low levels of noise while providing excellent image detail and high contrast. effortlessly spotting even the smallest heat signature at a range of up to 850m.

Axion XQ30 Pro - 384x288.......**£1079.95**

PULSAR IMAGE QUALITY

AXION COMPACT

Thermal Imager

NEW
THERMAL TECHNOLOGY
XG30
XG35
PULSAR
STREAM VISION 2

- Frost-resistant AMOLED Display
- Sensitivity amplification levels
- Pocket-sized and light weight
- Stream Vision 2 app support for iOS and Android
- Photo and video recording
- Wide field of view for easy scanning
- Rugged magnesium alloy housing

8 COLOUR PALETTES

Compact and affordable, perfect for those who wish to explore the possibilities of thermal vision without breaking the bank. Fitting in one hand and light to carry, they offer high thermal sensitivity and other premium features, including Wi-Fi connectivity and Pulsar's latest image processing algorithms.

Axion Compact XG30 - 640x480	**£1399.95**
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PULSAR TELOS SERIES

NEW LOWER PRICING!

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XQ35 LRF
XG50
XG50 LRF
XP50
XP50 LRF
XL50
XL50 LRF

TELOS XQ35 / XQ35 LRF

Thermal Imaging Monocular

Fully upgradeable devices with a 384×288, 17μm, <25 mK NETD European- made Lynred thermal sensor. Detection range1300m.

XQ35 - 384x288	**£1569.95**
XQ35 LRF - 384x288	**£1819.95**

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Fully upgradeable device with a 640×480, 12μm, <40mK NETD European-made Lynred thermal sensor. Detection range 2300m.

XG50 - 640x480	**£2329.95**
XG50 LRF - 640x480	**£2599.95**

TELOS XP50 / XP50 LRF

Thermal Imaging Monocular

With advanced Pulsar image boost technology and developed in-house algorithms give the highest level of detail, clarity, and contrast.

XP50 - 640x480	**£3099.95**
XP50 LRF - 640x480	**£2949.95**

TELOS XL50 / XL50 LRF

Thermal Imaging Monocular

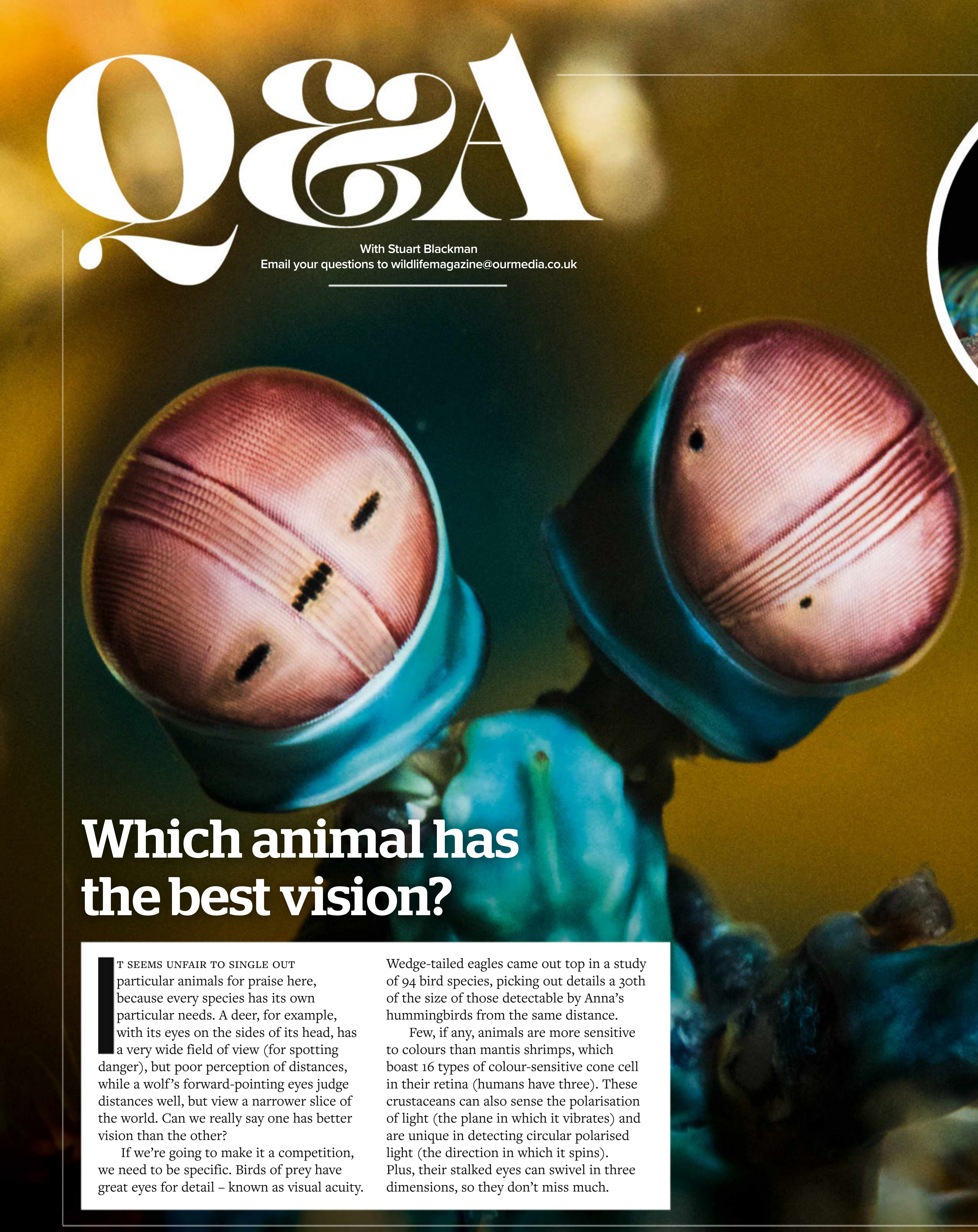
With large format 1024×768, 12μm, <40 mK NETD HD thermal sensor. Detection range of up to 2300m.

XL50 - 1024×768	**£3689.95**
XL50 LRF - 1024×768	**£3969.95**

E+OE Prices subject to change. Goods subject to availability

Q&A

With Stuart Blackman
Email your questions to wildlifemagazine@ourmedia.co.uk



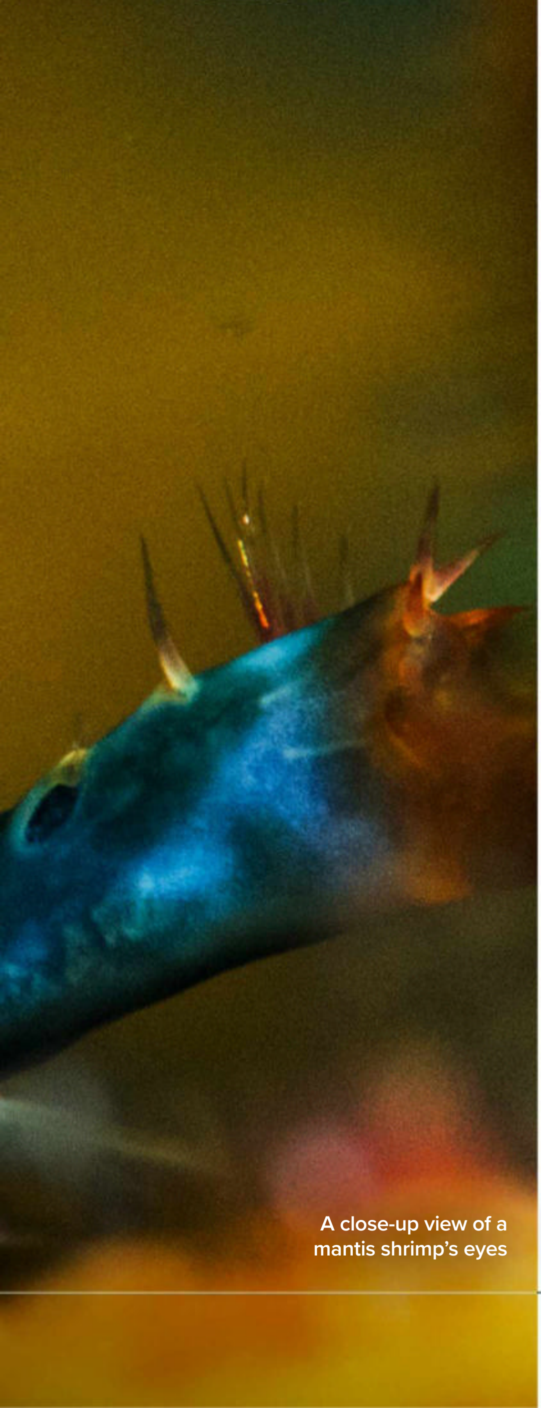
Which animal has the best vision?

IT SEEMS UNFAIR TO SINGLE OUT particular animals for praise here, because every species has its own particular needs. A deer, for example, with its eyes on the sides of its head, has a very wide field of view (for spotting danger), but poor perception of distances, while a wolf's forward-pointing eyes judge distances well, but view a narrower slice of the world. Can we really say one has better vision than the other?

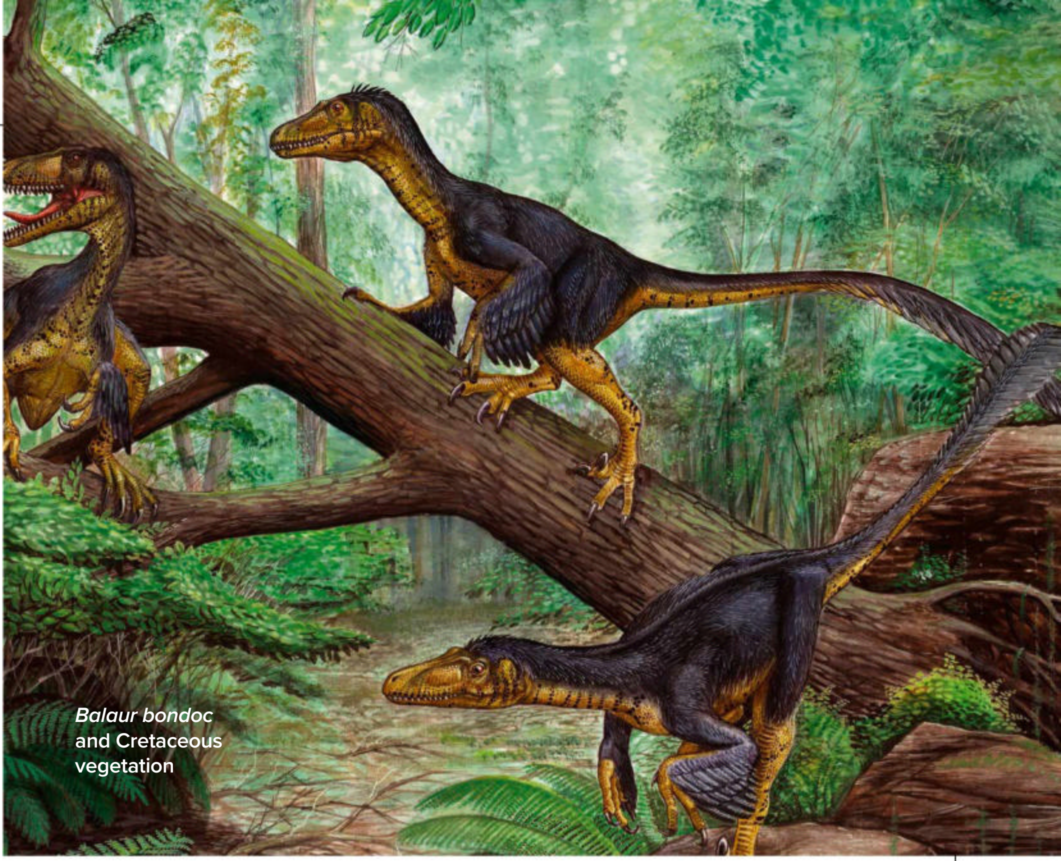
If we're going to make it a competition, we need to be specific. Birds of prey have great eyes for detail – known as visual acuity. Wedge-tailed eagles came out top in a study of 94 bird species, picking out details a 30th of the size of those detectable by Anna's hummingbirds from the same distance.

Few, if any, animals are more sensitive to colours than mantis shrimps, which boast 16 types of colour-sensitive cone cell in their retina (humans have three). These crustaceans can also sense the polarisation of light (the plane in which it vibrates) and are unique in detecting circular polarised light (the direction in which it spins). Plus, their stalked eyes can swivel in three dimensions, so they don't miss much.

The colourful mantis shrimp is highly intelligent too



A close-up view of a mantis shrimp’s eyes



Balaur bondoc and Cretaceous vegetation

Which plants existed in prehistoric times?

The term ‘prehistoric’ relates to the period of time that passed between the appearance of the first stone tools left behind by human-like apes (three million or so years ago) and the first written records, about 5,000 years ago, at which point proper history begins. For most of us, though, the word conjures scenes of a more ancient world than that, one populated by the likes of *T. Rex*, *Triceratops*, ichthyosaurs, pterosaurs, ammonites and trilobites. But the distant past was a time of botanical wonders, too.

Throughout human history (and prehistory), most of the planet’s vegetation has been composed of flowering plants, or angiosperms, in the form of trees, grasses, herbs, shrubs and bushes. But flowering plants didn’t appear until 130 million years ago. Before that, the world was dominated by other groups.

For hundreds of millions of years after life began, plants were largely restricted to the oceans. The first land plants, descended from aquatic algae, appeared about 500 million years ago and resembled today’s mosses and liverworts. These pioneers would have made the land more habitable for animals, by providing a source of food and fertilising the atmosphere with oxygen (a by-product of photosynthesis). By the time the first amphibians were hauling themselves out of the water (350 million years ago), terrestrial plantlife was well established, if still modest in stature.

But it was around that time that an early fern called *Wattieza* developed rigid woody structures that allowed it to grow to a height of at least 8m. Tree-like proportions were also reached by a type of horsetail called *Calamites*. These close relatives of the ferns grew in bamboo-like thickets up to 20m tall. Clubmosses got even bigger. Modern clubmosses are unobtrusive plants, just a few centimetres high, but during the Carboniferous period (360 to 300 million years ago), they reached 45m in height and formed dense forests.

> **“The first land plants appeared 500 million years ago”**

Meanwhile, the age of the dinosaurs could equally have been called the age of the cycads. These palm-like members of the gymnosperms, the group that includes pines, firs, larches and spruces, were among the first plants to produce seeds rather than spores. Cycads became dominant during the Triassic, Jurassic and Cretaceous periods (252 to 66 million years ago), and they would have been a plentiful source of fodder for the herbivorous reptiles that roamed the Earth back then, though their reign was brought to an end by the comet that finished the dinosaurs.

MANTIS SHRIMP: SHANE GROSS/NATUREPL.COM; SHRIMP: ALEX MUSTARD/NPL.COM; PREHISTORIC PLANTS: ALAMY

Ostriches (here a male) are found in Africa's deserts, savannahs and open woodlands

Australia's emu

Ostriches versus emus: what's the difference?

OSTRICHES AND EMUS HAVE MUCH IN common. For a start, they are both absolutely enormous. At 2.5m tall and weighing 130kg, ostriches are the biggest of all living birds, and emus are close runners up. Second, both are incapable of flight, with wings that serve only as balancing aids while running. Third, they are both kind of funny. Ostriches don't actually stick their heads in the sand to avoid danger, but it's a myth that somehow suits them. And it's not for no reason that Emu was the name of a hugely popular puppet famous for his unhinged assaults on talk-show hosts and members of the Royal Family during the 1970s and 80s.

The differences are perhaps not as obvious as you might expect, considering they've been evolving independently for about 50 million years. Certainly their plumage is different. Male ostriches are black-white-and-pink birds: bright wing and tail feathers contrasting strikingly with dark body plumage and rosy, bare skin on the neck and legs. But that is true only of the males. The slightly smaller females are more uniformly brown. Male and female emus are more similar, with shaggy, brown plumage that hangs like a grass-skirt, and a sweep of blue skin on the neck.

Should you ever need to identify them from a footprint, an ostrich has two toes on each foot, while an emu has three. And if all you have to go on is an egg, an ostrich's is creamy in colour, while an emu's is green. (Ostriches lay the biggest eggs of any living bird, though, relative to body size, they are the smallest.)

The reproductive lives of both are rather eccentric. Among ostriches, many females will lay eggs in a single nest that is tended by a resident pair. And emus eschew sex-role conventions – it's the females that do the courting and the males that do the bulk of the parenting.

Ostriches and emus live on different continents (Africa and Australia, respectively). They are, however, closely related. Both are members of a group called the ratites, which also includes other large, flightless (and funny) species, such as the rheas of South America and the cassowaries of New Guinea, but also the kiwis of New Zealand, which are much smaller, but no more capable of flight (and no less comical). New Zealand was also once home to the extinct moas, which were only slightly smaller than the elephant birds of Madagascar (also extinct), the biggest birds that have ever lived, at well over 3m tall. Then there are the tinamous of the Americas. On the face of it, these grouse-like birds look nothing like ratites, and yet skeletal and genetic similarities suggest they are the closest living relatives of the moas. Intriguingly, tinamous can fly, which suggests that the other ratites became flightless only after they all went their separate ways.

> "Both have eccentric reproductive lives"

RECORD BREAKER!

Which mammal has the biggest litters?

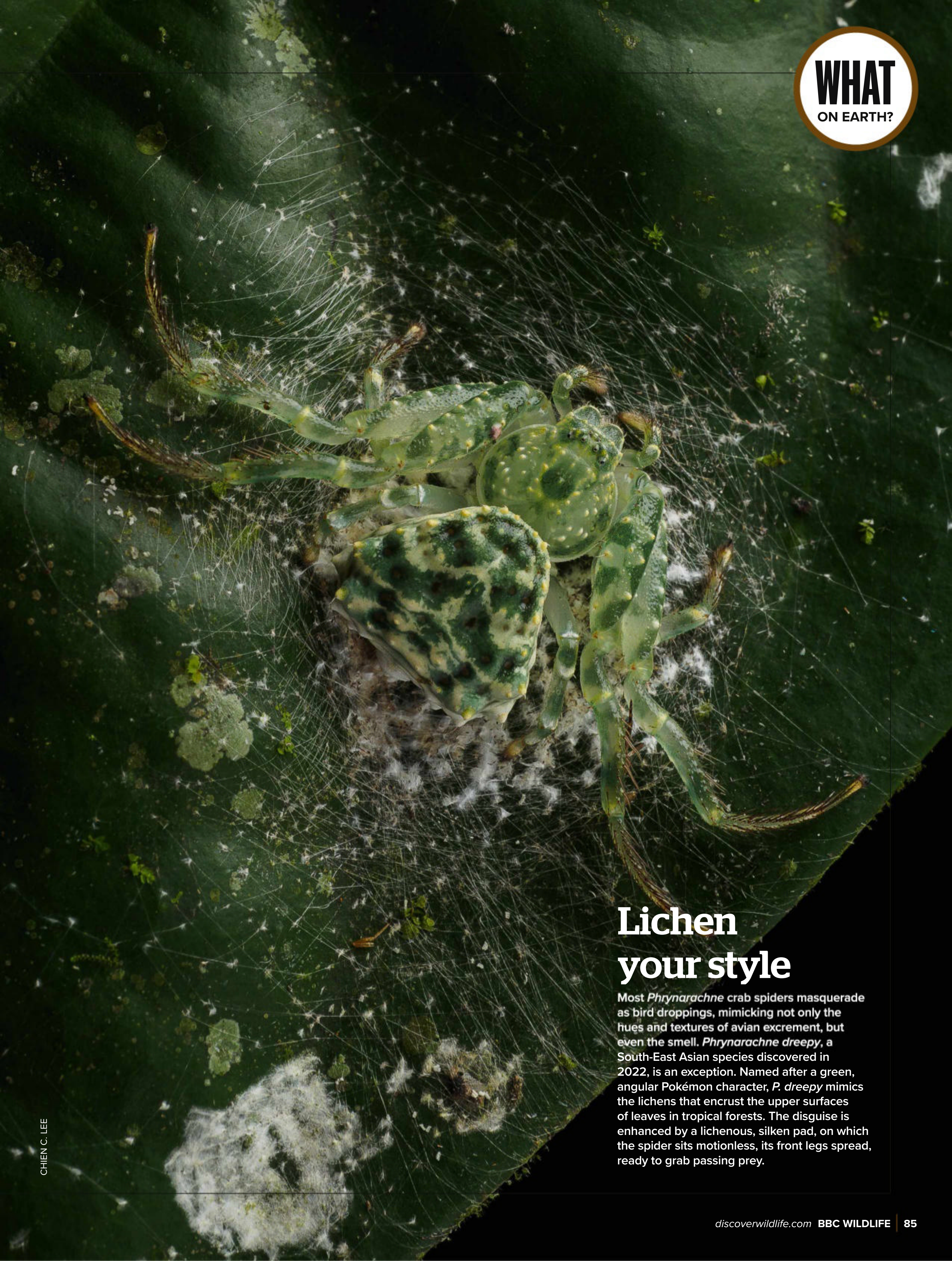
Young mammals are entirely dependent on their mother's milk for survival, so a female has little to gain by producing more offspring than she has teats. As a rule of thumb, a species' maximum litter size is about equal to the number of teats, while the average is about half that. The tailless tenrec, a spiny shrew-like creature from Madagascar, has more teats (26) than any other mammal and also holds the records for average (18.4) and maximum (32) litter size. Females have been seen foraging with 32 weaned young, suggesting that they can survive even without a teat each.

The tailless tenrec is a remarkable reproducer

FACT.

As many as 35,000 fish species have been discovered worldwide, which is more than the species of birds, mammals, amphibians and reptiles combined.

OSTRICH: ALAMY; EMU: ROBERT HARDING/ALAMY; TENREC: ARIADNE VAN ZANDBERGEN/ALAMY



Lichen your style

Most *Phrynarachne* crab spiders masquerade as bird droppings, mimicking not only the hues and textures of avian excrement, but even the smell. *Phrynarachne dreepy*, a South-East Asian species discovered in 2022, is an exception. Named after a green, angular Pokémon character, *P. dreepy* mimics the lichens that encrust the upper surfaces of leaves in tropical forests. The disguise is enhanced by a lichenous, silken pad, on which the spider sits motionless, its front legs spread, ready to grab passing prey.

CHIEN C. LEE

Q&A

Andean condors fly high in the mountains but don't seek out clouds

Are there any animals that live in clouds?

There don't seem to be any animals that seek out clouds as a habitat. While it's easy to imagine active flyers such as birds, bats and insects using clouds to hide from predators or prey, evidence that they do is lacking.

Indeed, the poor visibility might be a good reason to avoid them. Same for all the water droplets and ice crystals, which might make flying difficult. Then there is the weather and electrical activity associated with clouds. Even large birds can come a cropper in a storm and tend to steer clear. However, streaked shearwaters have been tracked flying straight through the centre of cyclones to avoid flying over land, an even more dangerous prospect for a seabird.

The atmosphere also contains more passive travellers. Many spiders, nematode worms, seeds and spores disperse on the wind. A single cubic metre of sky contains up to 100 million bacteria. These are at least in part responsible for clouds' formation, serving as points around which water vapour can condense. In which case, clouds gather around life forms rather than the other way round.

FAST ANSWERS

A spider sends out a strand of silk

How do spiders 'fly'?

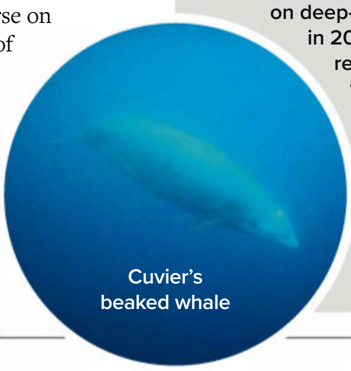
Spiders don't fly exactly; they 'balloon'. To get airborne, a spider climbs to the top of a plant or rock and stands on tiptoe, pushing its abdomen into the air and releasing strands of silk from its spinnerets. These are caught by the breeze, pulling the spider up into the air. Lift is also provided by electrostatic forces (the same ones that can make your hair stand on end in a storm). Spiders account for one in every 17 airborne invertebrates and have been collected at altitudes of nearly 5km. Only small spiders are capable of ballooning, and it's risky – many perish if they fall onto water.

Is there a name for a group of snakes?

Snakes are pretty unsociable animals, on the whole. Some tolerate each other's presence at feeding sites; others hibernate together. But for the most part, they are solitary creatures, so collective nouns aren't particularly useful. We do have the expression 'pit of vipers', which may have its origins in Native American culture. There is also 'nest of vipers', but this usually describes a gathering of disreputable humans rather than reptiles. 'Quiver of cobras' and 'rhumba of rattlesnakes' also pop up online, but are not used in real life to describe multiple serpents.

Which mammal can hold its breath for longest?

Cuvier's beaked whales feed mostly on deep-sea cephalopods and in 2020 an individual was recorded making a dive that lasted 222 minutes – the best part of four hours. They are, in turn, preyed upon by orca and may dive so deep and for so long to keep out of range of their predators.



Cuvier's beaked whale

CONDOR: JACK DYKINGA/NPL.COM; SPIDER: ALAMY; WHALE: TUI DE ROY

INSTANT EXPERT

Carbon and the carbon cycle

WITH EVOLUTIONARY BIOLOGIST JV CHAMARY

Mangrove forests are carbon 'sinks', absorbing CO2

CARBON IS THE CHEMICAL ELEMENT that allows life to exist, the core component of molecules in our cells and bodies. It eventually returns to the environment when we die, however, and the element must be recycled – via the carbon cycle – so it can be used again and again by living things.

What's special about carbon?

The element forms strong chemical bonds with others and produces many important molecules. One atom combines with two oxygen atoms to make carbon dioxide (CO2), for example, while long chains of carbon with added hydrogen atoms (hydrocarbons) or water (carbohydrates) form molecules whose bonds contain the energy – as fuel or food – that powers everything from petrol cars to the biochemical reactions in living cells.

Where does it come from?

Carbon ultimately originates from massive, dying stars. These burning balls of plasma forge elements that are scattered across the universe when one explodes in a spectacular supernova. The resulting interstellar dust – containing carbon and other elements – clumps together at the birth of star systems (including our Solar System) and give rise to planets and life. We are made of stardust.

So where is carbon found?

It's stored in reservoirs around the globe, including the atmosphere and oceans, lithosphere (Earth's rocky, outer layer) and biosphere (the total collection of living things). A reservoir becomes a carbon 'source' if it releases material – such as volcanoes or humans emitting CO2 into the air – or 'sink' if it absorbs more than it produces. Carbon sinks can include the sea, soil and forests created by plants and other things that use light and CO2 to make food via photosynthesis.

How does the carbon cycle work?

The carbon cycle is the continuous movement of carbon between reservoirs. For example, volcanic activity moves carbon from the lithosphere to the atmosphere; photosynthetic organisms shift carbon from the atmosphere to the biosphere; and burning food (by natural respiration) or fossil fuels (by artificial combustion) releases CO2 into the atmosphere, and some of that gas dissolves in oceans.

These movements are driven by processes that work on two different timescales. Fast processes often occur over years or decades because they involve biological activity, such as photosynthesis. Slow processes typically take place over hundreds of millions of years as they require geological activity: rocks are dissolved by rainwater (made slightly acidic by CO2) through weathering, for instance, which causes carbon to flow via rivers to the sea as minerals such as calcium carbonate.

Some marine organisms have shells or skeletons made of calcium carbonate, too, which sink to form sediments that turn into rock. The formation of sedimentary rock, whether from organisms or weathering, returns carbon to the lithosphere.

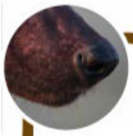
How are fossil fuels formed?

Organic matter such as plant material – containing energy-rich carbon molecules – can be fossilised by being buried in layers of sediments under conditions of high heat, pressure and lack of oxygen. Without decay, that carbon isn't broken down, which transforms the material into solid coal, liquid oil or natural gas.

Why can't the carbon cycle prevent climate change?

Burning fossil fuels releases gases such as CO2 that create a blanket that traps heat from sunlight in the atmosphere, causing the greenhouse effect that leads to global warming. But given that carbon continually flows between reservoirs, can't the cycle compensate for excess emissions? Well, it can… eventually.

Atmospheric CO2 concentrations were around 280 parts per million (ppm) before the Industrial Revolution (circa 1760-1840) and have now reached over 420ppm, and after 2030 it's likely that surface temperatures will have risen by 1.5°C. This warming reflects the fact carbon is released from sources faster than any sink or slow process can counter. So while the carbon cycle may well stabilise the climate in the far future, Earth would go through a period that's too hot for humans before it returns to being habitable for other living things.



NEXT MONTH

SMELL

How this sense is used among animals

MANGROVE: ALAMY; NOSE: INGRID BOELLAARD/ALAMY

A captive-bred juvenile Okarito kiwi, before its release into Okarito Forest, South Island

ALL YOU EVER NEEDED TO KNOW ABOUT THE

Kiwi

BY JO PRICE

Native to New Zealand, kiwis are flightless birds that are considered 'honorary mammals' due to their physical characteristics and behaviour. Iconography of these national treasures features widely across this island country in the southwestern Pacific Ocean, even though the birds are rarely seen. Kiwis are shy, nocturnal animals that are (for the most part) in decline, but conservation efforts are ongoing.

What sound do kiwis make?

The kiwi is said to be named after the distinctive, shrill call of male kiwis, which sounds like "kee wee, kee wee". These loud, piercing noises are used to attract a mate and mark territory. Female kiwis have deeper, raspier calls.

How big are they?

Kiwis are pear-shaped birds that are about the size of a chicken. The largest species of kiwi is the great spotted kiwi: males are approximately 45cm tall and weigh up to 2.2kg; females are approximately 50cm tall and weigh up to 3kg.

How many species are there?

The Apterygidae family includes five species: great spotted kiwi; Okarito kiwi (or rowi); North Island brown kiwi; southern brown kiwi and little spotted kiwi. All are listed as Vulnerable by the IUCN apart from the little spotted kiwi, which is listed as Near Threatened. Thanks to conservation efforts, the little spotted kiwi and Okarito kiwi have increasing populations, whereas the great spotted kiwi and southern brown kiwi are rapidly declining. The North Island brown kiwi has a stable population.

Why has the kiwi population declined?

According to charity Save the Kiwi, there are some 68,000 kiwis left. Predation from non-native predators (such as stoats and ferrets) and habitat loss are causing the decline and, consequently, the fragmentation of populations. Small and isolated kiwi populations may be less genetically diverse and are more vulnerable to localised events such as fire or disease. Motor vehicle strikes also threaten the birds.

What predators do they have?

According to New Zealand's Department of Conservation, "the biggest threat to chicks is stoats, and to adult kiwis, it's dogs". Cats and ferrets also kill kiwis. Chicks are vulnerable to stoat predation until they reach about 1kg in weight, which is when they can usually defend themselves. Introduced mammals, including rodents, also create competition for food in some areas, which delays the growth of chicks.

Where do kiwis live?

These nocturnal birds live in a variety of habitats, including forests (native and plantation), scrub, farmland, sand dunes and mangroves. By day they rest in burrows,

Top: long beaks are used to probe the ground for invertebrates. Above: unusually for a bird, the cryptic plumage is hair-like.

A captive North Island brown kiwi exhibiting foraging behaviour

hollow trees or logs, or under thick vegetation, and by night they forage.

How does a kiwi feed?

Shortly after sunset, a kiwi emerges to forage on mainly small invertebrates (fallen fruits and leaves are also eaten). It has very small eyes because sight is not a key sense that it relies on while searching for food in the dark, especially as most of its prey is hidden underground. This ratite has a highly developed sense of smell and is the only bird in the world with external nostrils at the tip of its long, slender beak. The kiwi walks along quietly thanks to the fleshy footpads on its large feet. As it moves, it taps the ground with its beak and probes the earth, plunging its beak into the soil to catch earthworms and larvae. The bird also uses its muscular legs to scrape the ground to disturb prey.

How do kiwis reproduce?

The main breeding season for most species runs from June to March, when food is plentiful. Kiwis tend to form monogamous pairs, and the female typically lays one egg in a burrow. Some species of kiwi rely on the male to incubate the egg (in other species, the male and female share this responsibility), with the average incubation time between 70 to 80 days. The chick hatches with an external yolk sac, which sustains it for the first 10 days. After that, it must find its own food. Sexual maturity depends on the species but females tend to breed at 3 to 5 years.

How big is a kiwi egg?

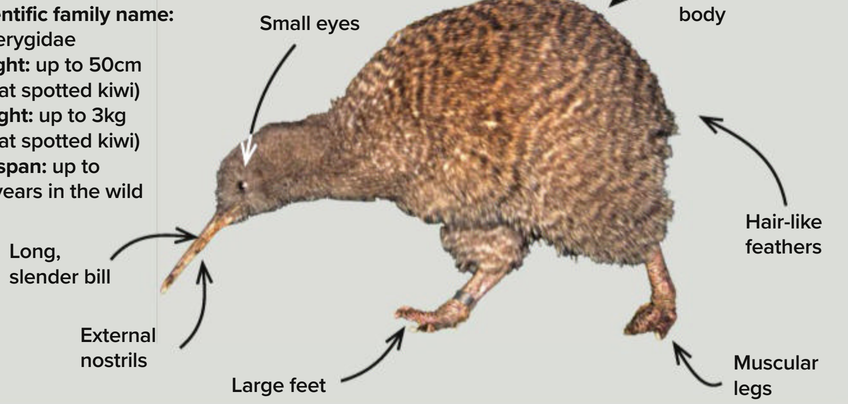
A kiwi egg is remarkably large compared to the bird's body size. According to the Guinness World Records, the southern brown kiwi lays the largest eggs relative to body size: "One female kiwi weighing 1.7kg laid an egg weighing 406g, which is almost one quarter of her total body mass, and weights of up to 510g have been reliably reported for other kiwi eggs."

How are kiwis being protected?

There have been significant successes in kiwi conservation in recent decades. However, most kiwis remain in unmanaged populations and therefore, nationally, the birds continue to decline. The Kiwi Recovery Plan 2018–2028 (the fourth recovery plan for kiwis) aims to grow the kiwi population in New Zealand to 100,000 by 2030 and involves a wide range of partners. The strategy includes habitat protection, predator control and breeding programmes such as Operation Nest Egg.

A KIWI'S SPECIAL FEATURES:

AT A GLANCE
Scientific family name: Apterygidae
Height: up to 50cm (great spotted kiwi)
Weight: up to 3kg (great spotted kiwi)
Lifespan: up to 50 years in the wild

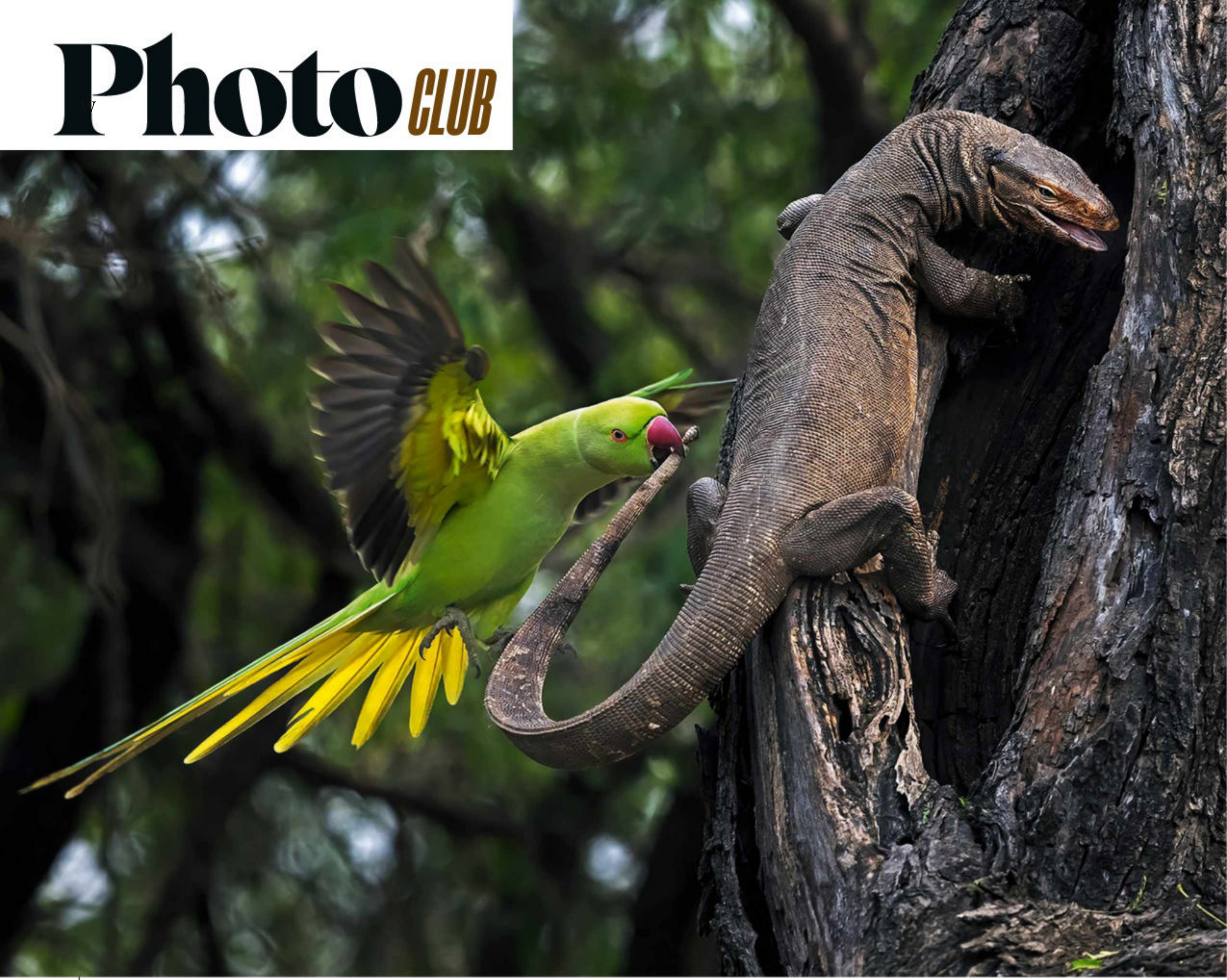


NEXT MONTH

WOLVES
Iconic and elusive predators

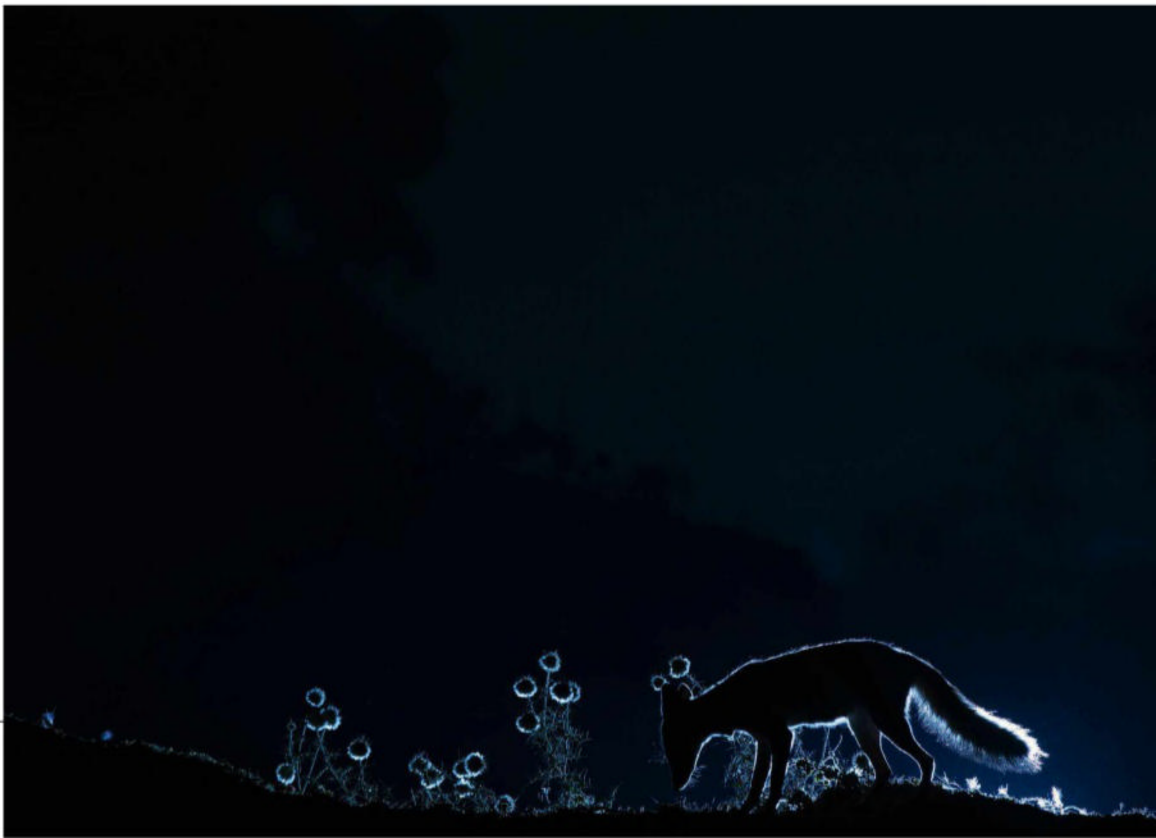
JUVENILE KIWI: GRANT MASLOWSKI/NATUREPL.COM; BEAK: TUI DE ROY/NATUREPL.COM; FEATHER DETAIL: TUI DE ROY/NATUREPL.COM; FORAGING KIWI: TUI DE ROY/NATUREPL.COM; SPECIAL FEATURES GREAT SPOTTED KIWI: TUI DE ROY/NATUREPL.COM; EUROPEAN WOLF: BLICKWINKEL/ALAMY

Photo CLUB



Bite back

In Keoladeo National Park, I've often seen rose-ringed parakeets attacking monitor lizards when they threaten a nest. This time one parakeet fetched a dozen others who all started biting the lizard's tail.
Hira Punjabi, Thane, India

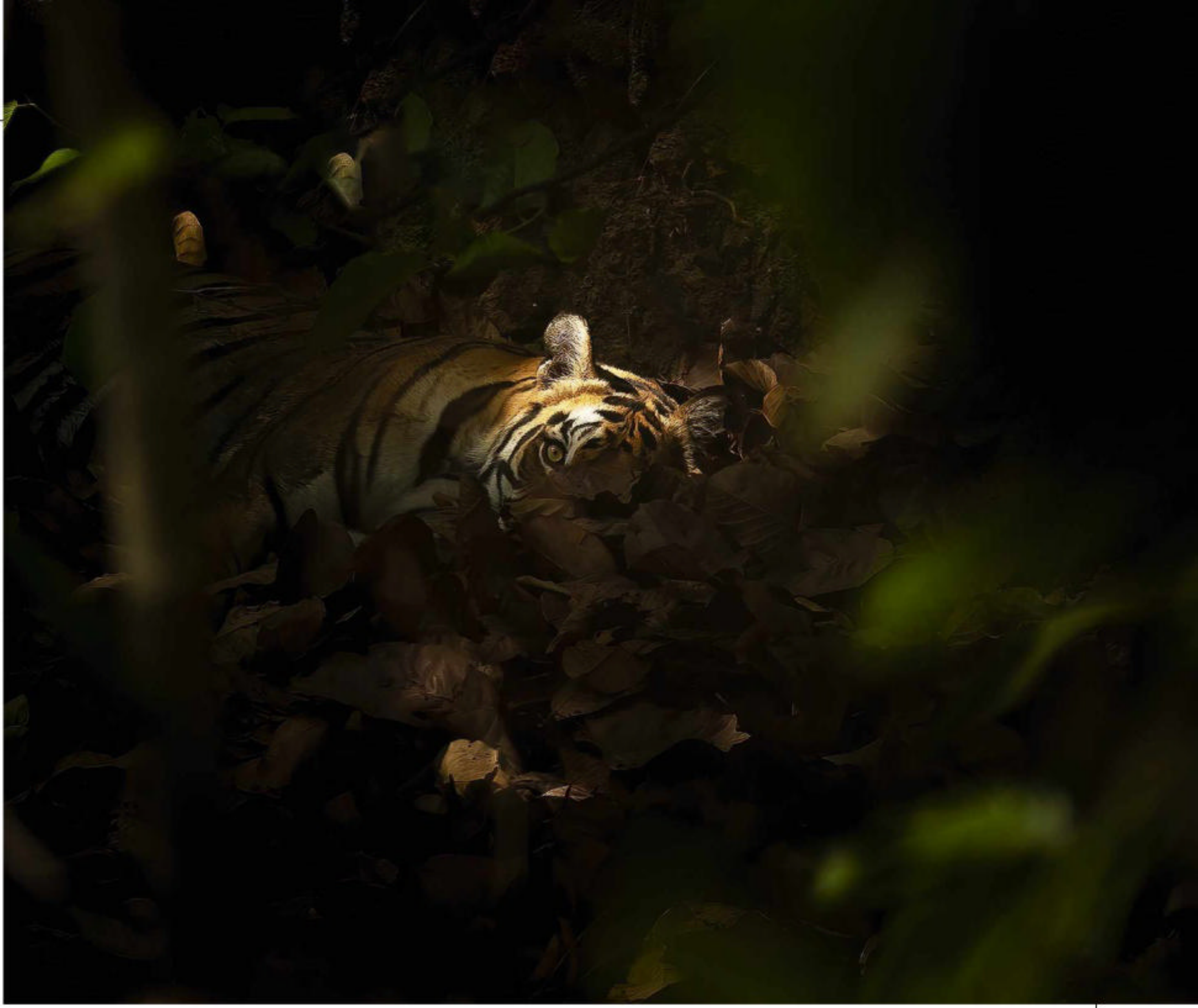


Waiting game

Locals told me about a pack of Bengal foxes that regularly visit an area at the foot of Tilaboni Hill, Purulia. I waited in the dark for almost two hours and finally captured my desired image.
Arghya Adhikary,
Kolkata, India

SHARE!

Send your pics to **discoverwildlife.com/submit-your-photos** to see them in print!

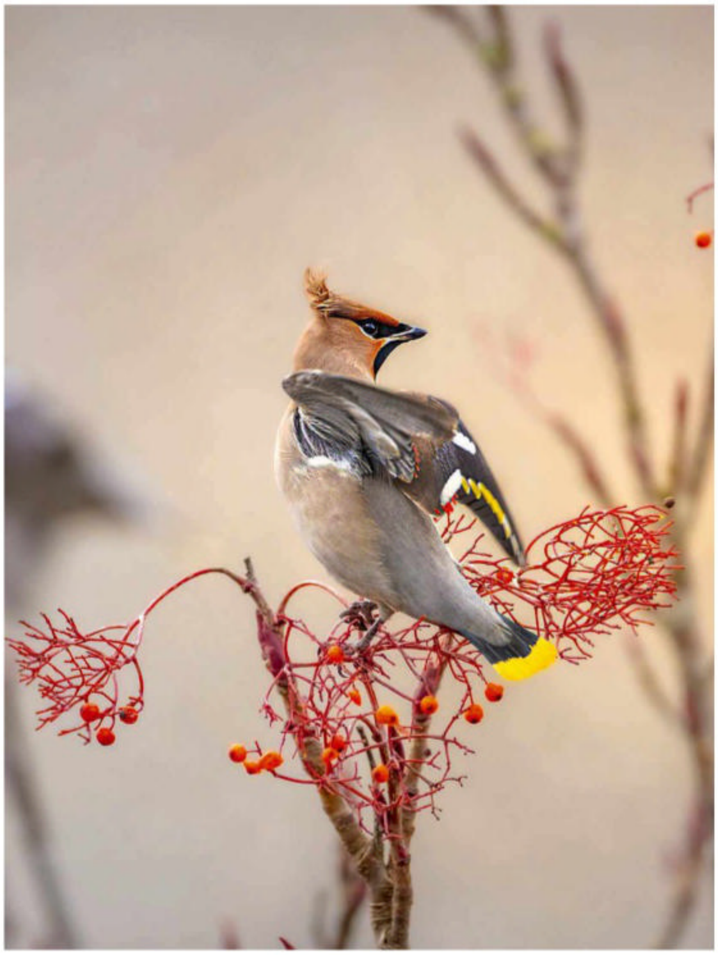


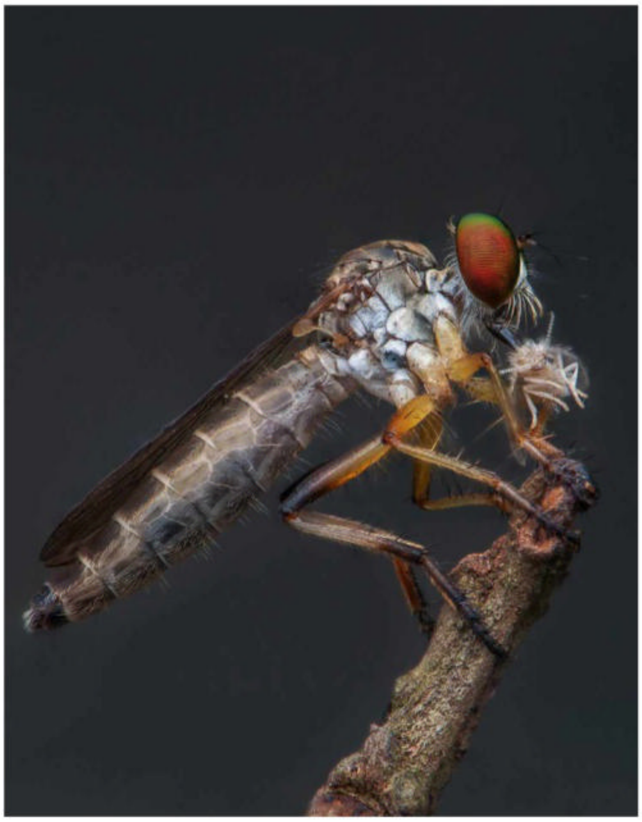
Hidden tiger

After a day with no luck in Sanjay Dubri National Park, a rustle in the dried leaves revealed a Bengal tiger, staring at us.
Sudhanshu Tiwari, Indore, India

Berry picking

Waxwings are rare visitors, but many will fly to the UK and Ireland to feed on rowan and hawthorn berries when there's a shortage in Scandinavia.
Julie Caffrey, Wicklow





Dinner's ready

Having sprung on its prey, this robber fly uses its proboscis to penetrate the body of a white fly with anatomical precision.
Polwatta Siriyalage Chamara Sulakkhana, Ambalangoda, Sri Lanka

Justin plunges into his working week

SNAP-CHAT

WITH *BBC WILDLIFE* PICTURE EDITOR TOM GILKS

Justin Gilligan on giant spider crabs and holding hands with an octopus

How did your career start?

I learned to dive aged 14 and started taking pictures underwater shortly afterwards. There were some easily accessible dive locations on the east coast of Australia where I grew up, with reefs and ledges adorned in a living veneer of macro and invertebrate life. I instantly fell in love with its natural beauty, and the sense of exploration that comes from spending time underwater.

Which of your images means the most to you, and why?

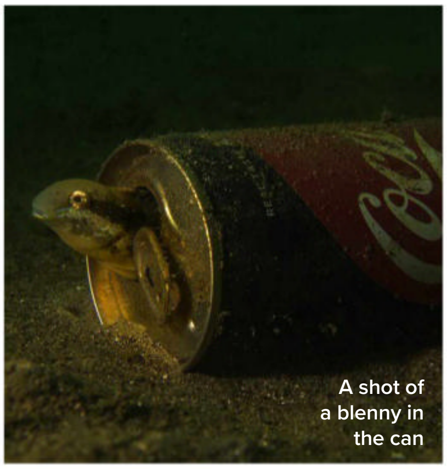
My image entitled *A Diet of Deadly Plastic* won 'Oceans: The Bigger Category' in this year's Wildlife Photographer of the Year competition. It shows a record-breaking 403 pieces of plastic removed from the digestive tract of a flesh-footed shearwater. It is a horrible picture, but I'm grateful to have been able to communicate the story through the competition.

What's been your most memorable encounter with marine wildlife?

A few years ago, I was photographing marine scientists transplanting kelp onto artificial reefs in the cold waters off south-east Tasmania. A field of spider crabs wandered through the experiment, pursued by a Maori octopus. It was totally unexpected and reinforced just how little we know about these reefs.

What draws you to the marine world?

I'm drawn through both scientific intrigue and artistic expression. I recently sought some advice from Roz Kidman Cox, who suggested that I need to let go of my inner scientist. On reflection, this has been a constant conflict for me, but how wonderful to find a career in a space that inspires both an inner scientist and an inner artist.



A shot of a blenny in the can

BLENNY IN COKE CAN: JUSTIN GILLIGAN

Have you ever lost any gear to an ocean creature?

I've learned how to befriend an octopus. I keep still, present my hand and pretend not to look directly at it. It eventually can't contain its own intrigue, and rolls out a tentacle to feel around, getting bolder and bolder. I nearly lost my dive watch and a glove while 'holding hands' with an octopus in this way.

Any epic fails to share?

I have had too many to admit from the good old film days! There was something romantic about having just 24 or 36 exposures on a single dive. You had to be thoughtful about your subject, focus, exposure and composition, and that really influenced how I work today. There were many times, however, when I rushed off to develop the film, only to find the pictures didn't remotely reflect the magic I was expecting.

Which species would you love to photograph that you haven't yet?

Giant kelp. The only place this species occurs in Australia is off southern Tasmania. These waters are warming faster than the global average, and giant kelp has declined by 95 per cent. I'd love to spend more time exploring these forests before they disappear.

What's been your most rewarding photographic project?

Documenting the marine biodiversity in Sydney Harbour. I would drive through gridlocked traffic and battle to find somewhere to park, then would head into the water and be completely amazed by what I found – whether it was a seahorse using its tail to cling to swimming enclosure netting, a blenny living in a repurposed can of Coke, or a flowing stand of kelp at the foot of Sydney Harbour Bridge.

What piece of camera kit would you not be without?

A light-shaping device that I made from plumbing bits and pieces. It attaches to my underwater strobes and does an amazing job of taking the edge off light spillage.

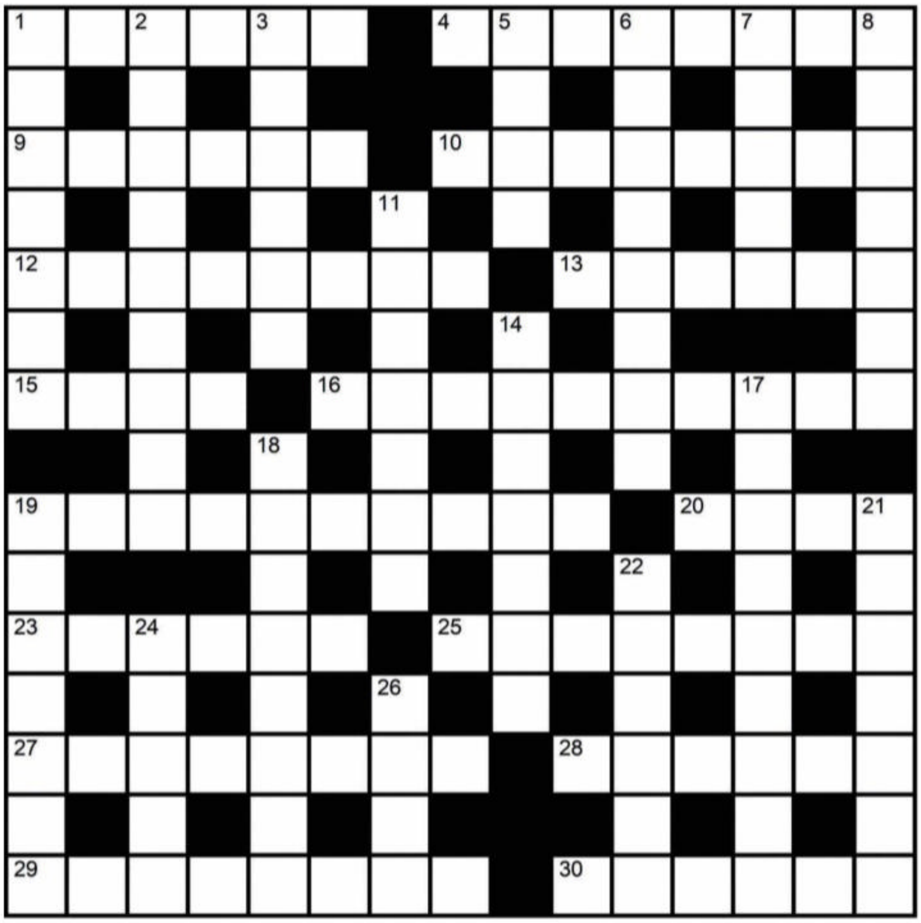
Any tips for budding photographers?

It's a cliché, but try and find a subject in your local area to become passionate about and expert in. Hone your photographic skills in your own backyard.

Justin is a conservation photojournalist from Australia. See his work at: justingilligan.com.

wild PUZZLES

The crossword



ACROSS

1 ___ worm, invertebrate in the phylum Nemertea (6)

4 Cross-shaped, like a mustard flower (8)

9 ___ alkaligrass, plant native to far north-eastern North America (6)

10 Biting fly and malaria vector (8)

12 Slender fish-like filter feeder (8)

13 WWT reserve on the Ouse Washes (6)

15 Very small branch (4)

16 Deciduous species that may be honey, black or water (6,4)

19 Migratory warbler (10)

20 Long-billed wading bird (4)

23 Month in which most UK swifts depart for Africa (6)

25 Widespread succulent plant (4,4)

27 Pheasant-like bird of Asian mountain regions (8)

28 Folk name for a green woodpecker (6)

29 Malabar ___, arboreal amphibian (4,4)

30 Fig tree subspecies (6)

DOWN

1 Widespread brown butterfly (7)

2 Flightless bird that may be Southern or North Island (5,4)

3 ___ vole, endemic island subspecies (6)

5 Farmland crow (4)

6 Hummingbird that may be festive, frilled or spangled (8)

7 Concerning birds (5)

8 Adaptive, genetically distinct group within a species (7)

11 Country of southern Africa, home to the endangered white-tailed rat (7)

14 Wild cattle of Africa and Asia (7)

17 Predatory insect in the family Asilidae (6,3)

18 Branching stalk or limb (8)

19 Woodland songbird with grey, white and black plumage (4,3)

21 Term for a seed dispersed by ocean currents (3-4)

22 US state, home to the desert bighorn sheep (6)

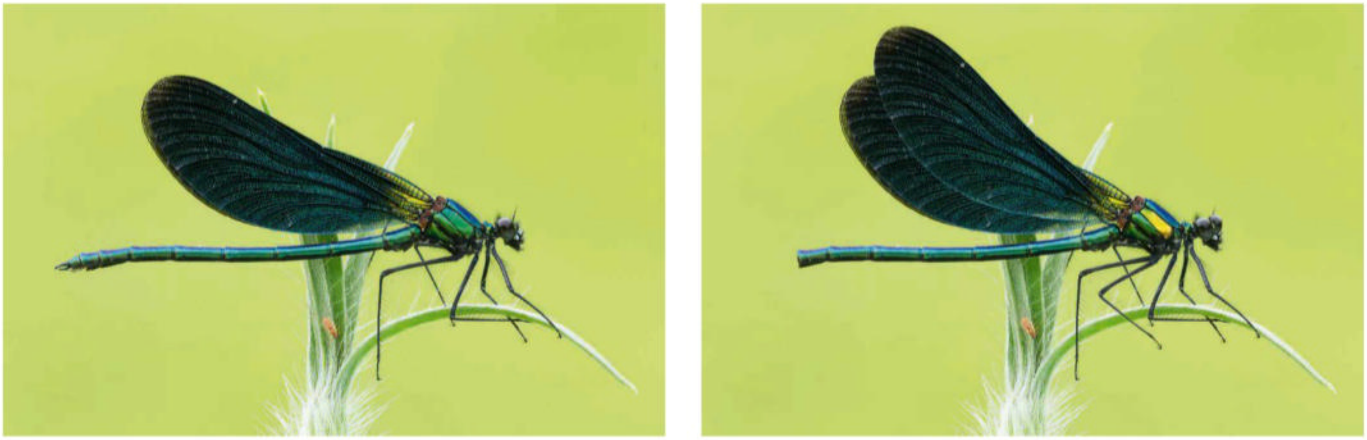
24 To browse on grass or other vegetation (5)

26 Indonesian island, home to endemic rhinoceros and gibbon (4)

November crossword

Across: 1 cow parsley, 6 asps, 9 bromegrass, 10 tree, 12 striped pipit, 15 henbane, 16 narwhal, 17 treetop, 19 chevron, 20 water boatman, 23 axil, 24 reciprocal, 25 ewes, 26 bristle oat.
Down: 1 cubs, 2 wood, 3 Aleutian tern, 4 service, 5 eastern, 7 Shropshire, 8 sweat gland, 11 spurge laurel, 13 white whale, 14 insect bite, 18 pioneer, 19 catkins, 21 echo, 22 flat.

SPOT THE DIFFERENCE



This exotic giant of the damselfly world is called the beautiful demoiselle and iridescent flashes of its fluttering metallic wings can be seen along riverbanks as males put on a show for females. Can you spot all five differences between the two images? Turn to page 96 to find the answers.

DAMSELFLY: MIKROMANG/GETTY

NATIONAL TREASURES

From snowy peaks in the Cairngorms to ancient monuments in Dartmoor, national parks are a source of beauty and pride for the UK. Read on to learn more about these precious spaces

Dramatic moorland, verdant hills, leafy forests – go walking somewhere beautiful in the UK and you may well be in one of its 15 national parks. But how long has the UK had national parks? And how did they come into existence? The Ramblers, Britain's walking charity, explains the origin story of our most-loved green spaces and looks to the future of walking in protected areas.

Puffin in Pembrokeshire Coast National Park

FIRST SHOOTS

Whether it's stunning natural landscapes, incredible wildlife or unique cultural stories, national parks have the power to lift us above the everyday. The world's first was Yellowstone, established in 1872, followed by 62 other national parks across the United States. Inspiration from across the pond was integral in the creation of the UK's first national parks, but there were practical necessities, too. As the country began rebuilding after the Second World War, officials acknowledged that alongside a new welfare state and education system, it was vital to safeguard the precious natural environment – and enshrine a public right for everyone to access and enjoy it.

After growing pressure to extend public access and create national parks, the National Parks and Access to the Countryside Act was introduced in 1949 and a blueprint for creating the parks was agreed.

ROOTS TO REALITY

The first four – Peak District, Lake District, Snowdonia (now known by its Welsh name, Eryri) and Dartmoor – were confirmed in 1951, with others following soon after. By 1957, Pembrokeshire Coast, North York Moors, Yorkshire Dales, Exmoor, Northumberland and the Brecon Beacons (now Bannau Brycheiniog) joined

Wild mountain goat in Eryri National Park

The stunning landscape of Cairngorms National Park

Images: Getty/ Iweta0077, C T Aylward. Photos by R A Kearton and Alexey_Fedoren

the ranks. For the first time, as well as national parks, there were long-distance paths and national nature reserves – making it possible to explore and appreciate some of the country's most beautiful landscapes.

PRIDE OF PLACE

Today our national parks provide the space to enjoy the great outdoors in a myriad of ways. Go mountain biking in Eryri (Snowdonia), wildlife watching on the Pembrokeshire Coast, caving in the Peak District and stargazing in Exmoor. And on top of all these incredible activities, every national park in the UK offers fantastic hiking opportunities. From easy strolls on well-marked paths to challenging climbs on craggy trails, walking across these protected areas is the best way to experience the natural wonders up close.

FOR EVERYONE

The Ramblers has been part of Britain's national park journey from the start, supporting their creation since the charity was founded in 1935. Today, the Ramblers continue to make sure everyone has access to green spaces. This includes protecting and improving paths, organising group walks and sharing advice and training to build skills and confidence in the outdoors. The aim? To ensure everyone can enjoy the pleasures of walking, whether in our treasured national parks or close to home.

RAMBLERS

Check out *Walk* magazine at **walk.ramblers.org.uk** to read more from the Ramblers

Dartmoor National Park

NATIONAL PARKS IN NUMBERS

Oldest Peak District, designated in 1951

Newest South Downs, designated in 2010

Largest The Cairngorms at 1,748 square miles

Smallest The Broads at 117 square miles

Least populous Northumberland with 2,200 residents

Most visited Lake District, with 18.1 million visitors in 2023

Your LETTERS

Low-intensity grazing can benefit wildlife

Sharing the landscape

IN RESPONSE TO JAMES FAIR’S ARTICLE ‘Can cattle help wildlife?’ (Special Report, October 2024), I agree that it is unbalanced to view livestock farming as solely detrimental to wildlife. In South West England, where I live, the landscape is dominated by sloping hills with high rainfall, and livestock farming on grassland is most prevalent. If these hills were to be cultivated for a plant-based diet, there would be huge soil and agricultural run-off, further polluting our rivers. According to Plantlife, converting grassland into arable farmland can cause a 59 per cent decline in soil carbon. The grasslands in the UK store over 2 billion tons of carbon, which can be greater than in some forests.

Also, animal products are key sources of nutrition. It’s worth noting, however, that the consumption of beef and sheep products in the UK has actually declined since the 1960s, with a large increase in poultry consumption.

All intensive agriculture, whether livestock or arable, with its associated soil loss, use of pesticides and habitat degradation, has severely damaged wildlife. We need to work towards a landscape where we can maintain both wildlife-rich areas and food security. Environmental Land Management schemes and advice and financial support to farmers will be key in ensuring that farms can boost biodiversity.

Jamie Buxton-Gould, via email

JAMES FAIR REPLIES:

These are all excellent points. I would only add that the benefit of a more plant-based diet is that it frees up land for more wildlife-friendly, conservation grazing by cattle and ponies. You mention the increase in chicken consumption, which of course has had deleterious impacts on our rivers, especially the River Wye.

Bird trapping

Thank you to Mark Carwardine for highlighting the reprehensible practice of illegally trapping and killing wild birds in Europe (October 2024). The perpetrators say it’s traditional, but so was slavery. I wish our government was able to put pressure on the EU to honour their responsibility in ending this illegal business once and for all.

Dr Malcolm Foulds, via email

Wildlife tourism

I appreciate the benefits of linking nature conservation to improvements in the lives of local people. However, in your article ‘See it, save it?’ (November 2024), I was very disappointed to see increased global GDP – the fetishisation and pursuit of which is rapidly destroying anything natural on Earth – cited as a plus for wildlife tourism.

Greg Brown, via email

Red kites

The sight of these majestic but much maligned birds inspired the following poem.

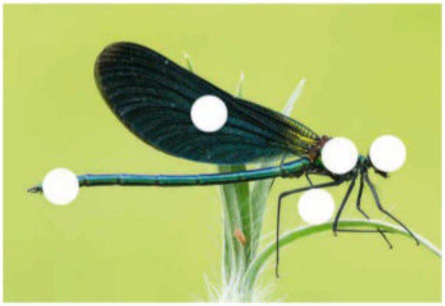
On Eccup reservoir at dawn,
the water’s calm
And only early risers see us leave
our nests
To soar above bridle path, stately
home and farm;
To some a noble sight, yet others
think us pests.

How are we then to live our own
allotted span,
Unless the folk of rural Yorkshire
learn to hold
Our beauty dear and cease to find a
threat to man
In our far-seeing hooded eyes of
amber gold.

Our tails are forked but not our tongues.
They must believe
That we’re but carrion birds whose
only living prey
They wouldn’t deign to eat. Much
finer fare we leave
To those who work the land and need
to make it pay.

Our talons are not stained with blood
of plundered game
And our great wings of chestnut red
will draw the crowds,
Our piping whistle summon those
with just one aim;
To see us in full flight against the
northern clouds.

Maggie Cobbett, Ripon, North Yorkshire



Answers to Spot The Difference on page 93

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COW AT KNEPP: DOM GREVES/ALAMY; EUROPEAN DAMSELFLY: GETTY

BBC wildlife

After a rollercoaster ride, the national bird of the USA is thriving

NEXT MONTH

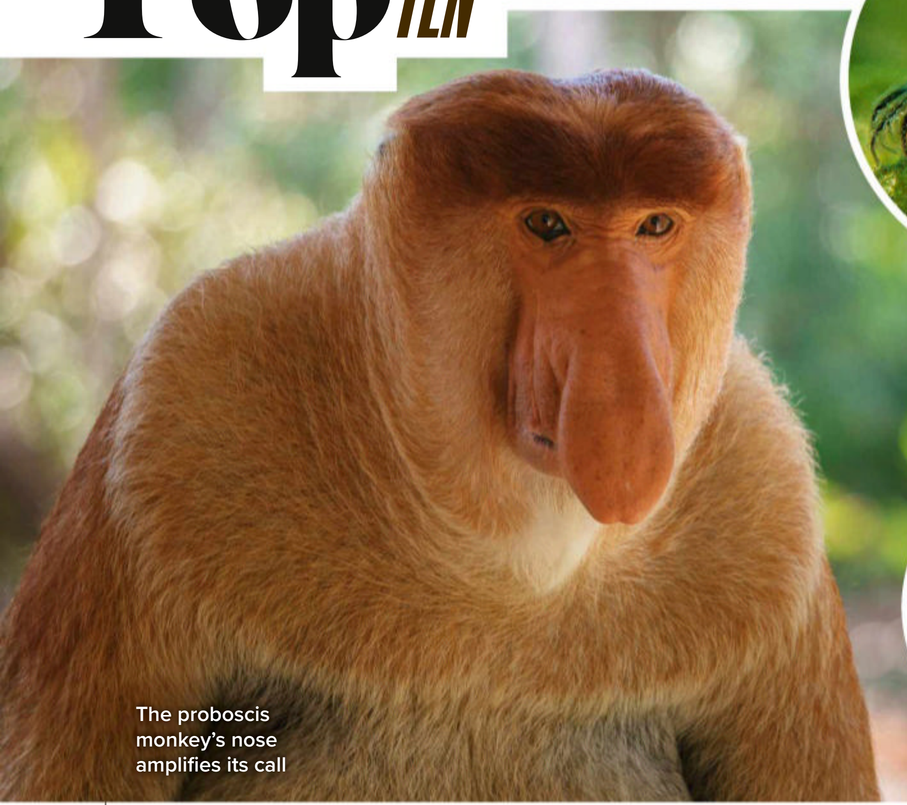
Bald eagle comeback

By the 1960s, bald eagles were in severe decline in the USA, a result of hunting, habitat loss and use of the pesticide DDT. In the decades that followed, the species made a spectacular recovery, thanks in part to the pioneering fieldwork of one young conservationist. This is the story of Tina Morris, and of the iconic bird that she helped to restore to America's skies.

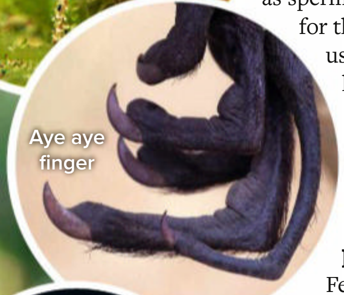
ON SALE
9th
JANUARY

BALD EAGLE: GETTY

Top TEN


The proboscis monkey's nose amplifies its call

Anglerfish esca


Aye aye finger

Burrowing asp fangs

Weird bodyparts

From pendulous noses to pseudo-penises

1. Proboscis monkey nose

This strangely snouted primate is endemic to Borneo, living in swampy mangrove forests and along rivers. The pendulous nose belongs to the males and is thought to help attract females. A loud, deep roar advertises a male's health and dominance to prospective mates and the nose acts as an echo chamber, allowing him to produce louder calls.

2. Aye aye finger

A lemur from Madagascar, the aye aye uses its 8cm-long, almost skeletal-looking middle digit to tap on trees and locate cavities in the wood that house insect larvae. It then gnaws into the wood with rodent-like incisor teeth before extracting grubs with the same elongated finger. The primate has also been seen using this handy tool to pick its nose!

3. Burrowing asp fangs

Instead of facing downwards, this underground snake's fangs point backwards. Reminiscent of a stiletto dagger, they give the snake its other common name of stiletto snake. The unusual angle of its fangs allows it to strike moles and other burrowing mammals in a confined space or as they try to escape. They can even be used when the snake's mouth is not completely open.

4. Hammer-headed bat nose

The largest bat in continental Africa has a giant hooter that makes it look like a gargoyle. As with proboscis monkeys, the large nose is unique to the male and acts as a resonating chamber – a large air sac that allows it to produce loud honking sounds that catch the attention of females.

5. Chameleon hemipenes

A male chameleon has two hemipenes – reproductive organs at the base of its tail. These complex, spiny structures are usually tucked away inside the body and emerge only during mating or when under stress – and they are quite a sight! It's thought the strange shape of these organs helps to transfer sperm and stimulate females.

6. Sperm whale spermaceti

Despite the name, this bodypart has nothing to do with sperm or reproduction. Located in a sperm whale's head, it's believed to be involved in the production of sound and echolocation. The spermaceti is filled with a pale-yellow waxy fluid commonly known as sperm oil. Demand for this commodity, used in lighting and lubrication, led to the near extinction of sperm whales in the 19th century.

7. Spotted hyena pseudo-penis

Female spotted hyenas are the only placental mammals to have a pseudo-penis and lack an external vaginal opening. The clitoris is positioned and shaped like a penis and the labia are fused to form a pseudo-scrotum. Females both mate and give birth with this pseudo-penis. It's thought this 'masculine camouflage' and blocking of the reproductive tract gives females greater control over who they mate with.

8. Geoffroy's spider monkey clitoris

Like the spotted hyena, the female of this species is often mistaken for a male due to her extra-long dangling clitoris. However, unlike the hyena, the monkey's genitals are not as visually similar, and females have an external vagina. The clitoris acts as an advertisement, helping males determine the receptiveness of a female through touch and smell.

9. Anglerfish esca

The female of this deep-ocean fish has a glowing lure protruding from the top of her head. Known as the esca, this appendage – a dorsal spine topped with a bulb of bioluminescent bacteria – entices unlucky fish as prey. It also aids reproduction by attracting the attention of males.

10. Wallace's sphinx moth tongue

In 1862, Charles Darwin was sent an orchid from Madagascar with an extremely long nectar tube. He replied: "Good heavens, what insect can suck it!" His contemporary, Alfred Russel Wallace, predicted that an insect with a similarly long tongue would be found. He was eventually proved right by the discovery of this moth species and its proboscis that can reach up to 35cm in length! **Leoma Williams**

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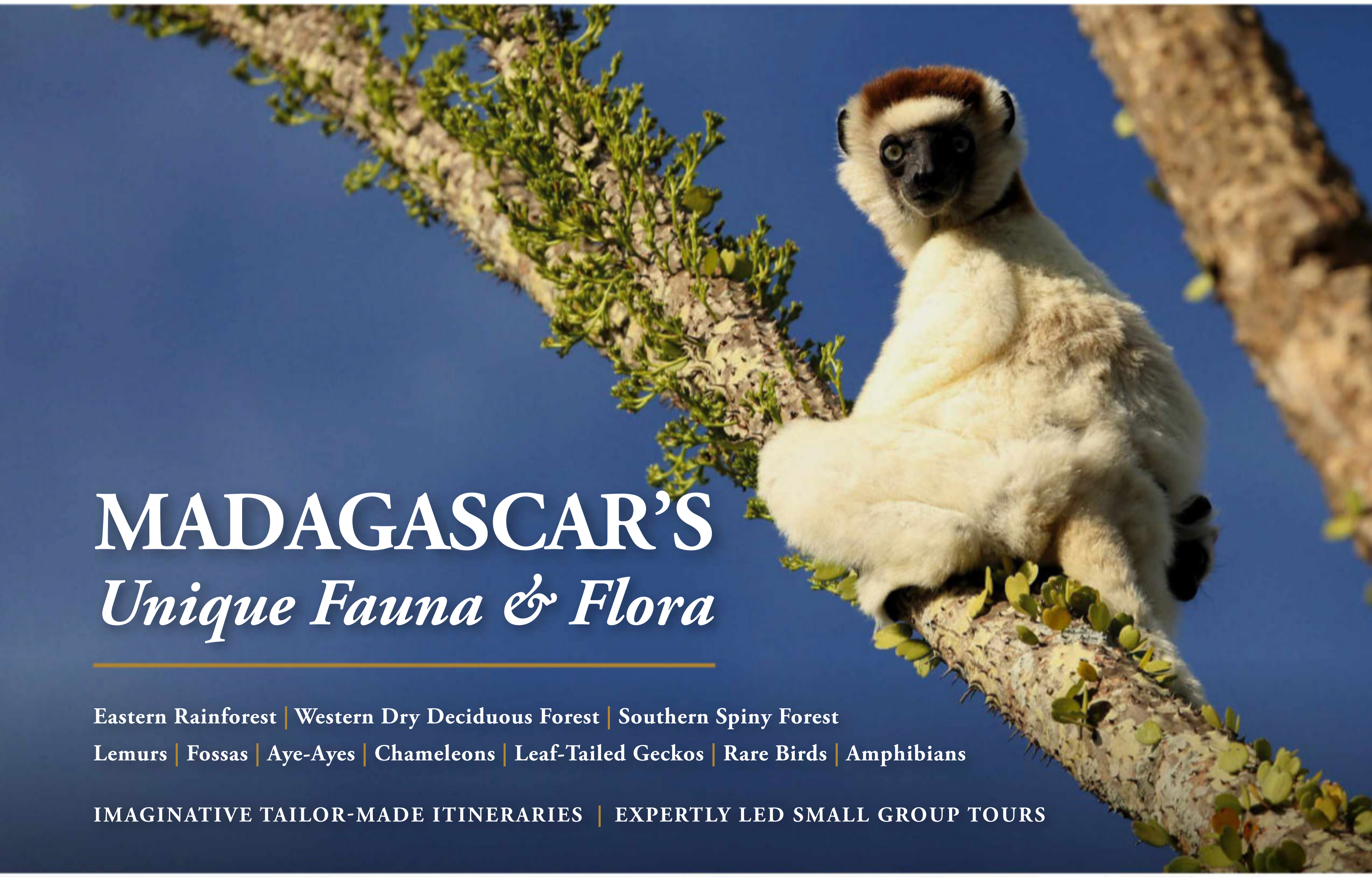

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